- $20,000,000 expansion at Hammermill
- Depreciation reform and a balanced budget
- Atomized suspension technique
- Miscellaneous synthetic resin adhesives

The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

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Hammermill's $20 million expansion. See page 698.

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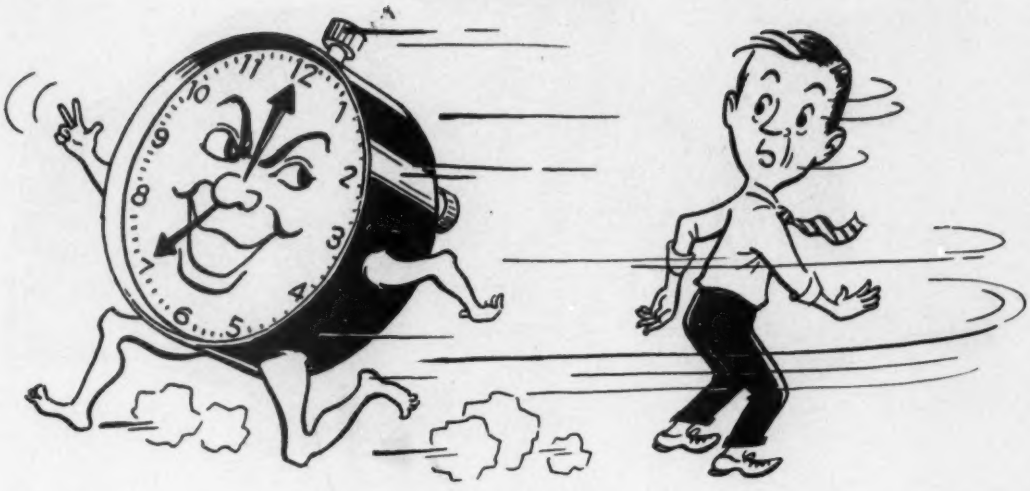

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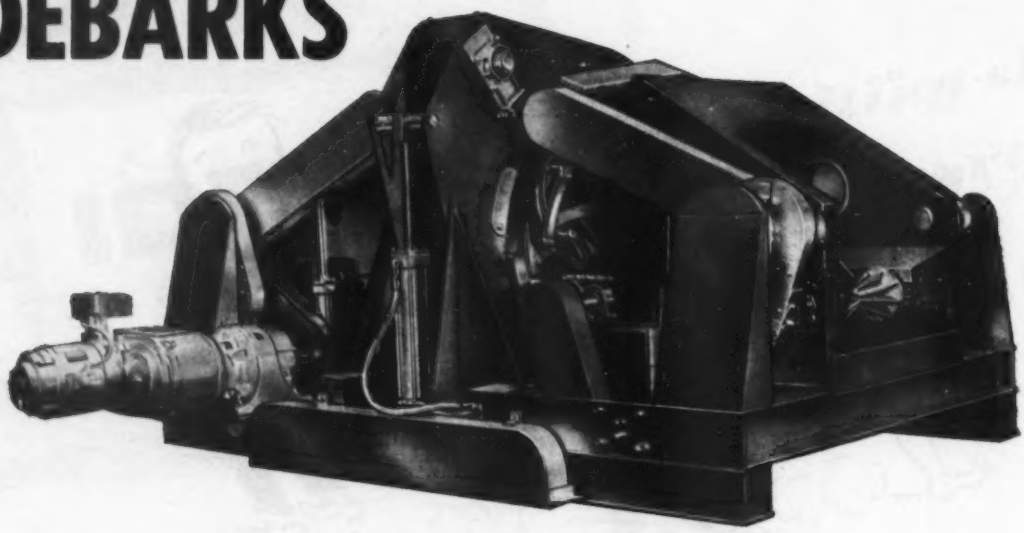

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The Paper Industry

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VOLUME 41 **NUMBER 10** **JANUARY 1960**

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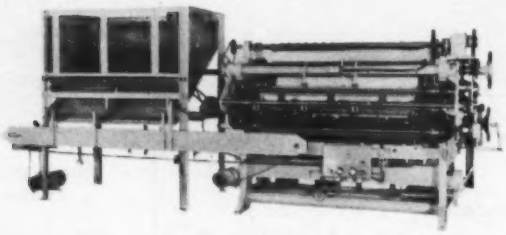
and development
of converting machinery



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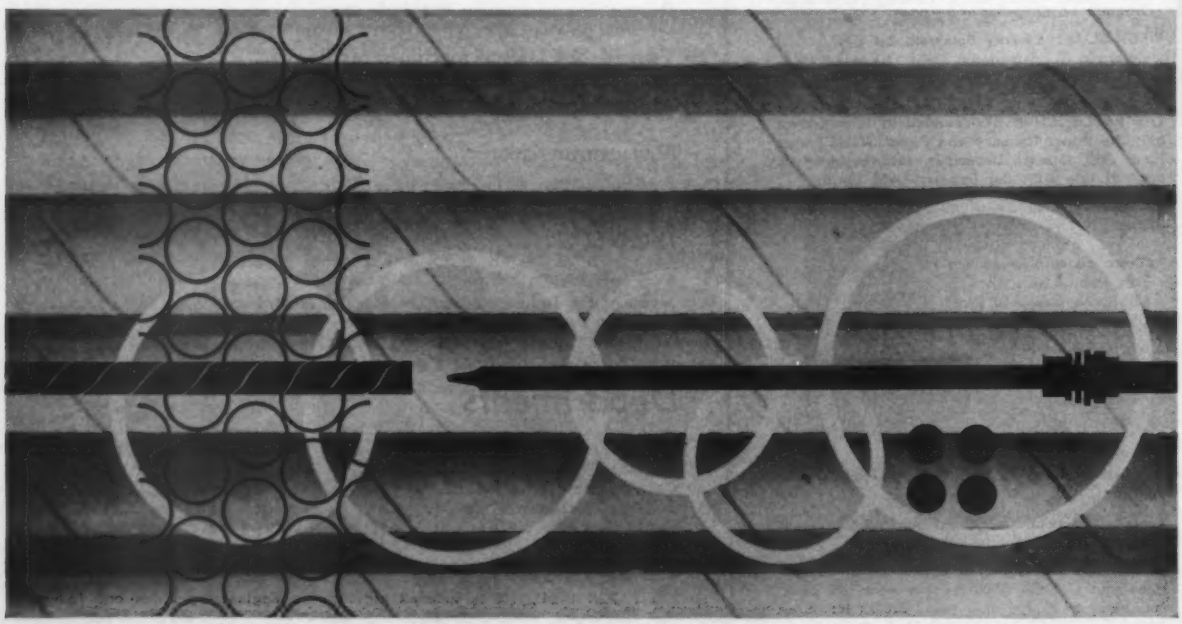

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From our point of view..

Preview of the prosperous sixties

With our entry into the widely heralded era of the sixties which is to usher in a new high in prosperity, we are naturally focusing our attention on any signs of reassurance that these promises will be realized.

Authoritative consensus, with few exceptions, seems firmly oriented in the belief that the prosperity predicted for this decade is a certainty, although this conclusion is tempered with the understandable qualification that its imminence and progress are closely tied in with a satisfactory solution of labor problems.

In a report, released by the U. S. Department of Commerce on December 21, an increased demand for paper and paperboard products is envisaged that would require a record output of about 36 million tons of paper and paperboard in 1960. This would be a 6 per cent increase over the 1959 output which was valued, in terms of sales, at $12 billion.

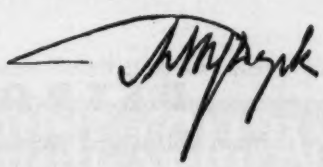
Investment for new plant and equipment used by the pulp and paper industry is estimated at $828 million in 1960, which is a 35 per cent increase over the capital expenditure for this purpose in 1959.

FAO's most recent long-range estimates of paper and paperboard requirements on a world-wide scale predict a demand of 88 million tons by 1965 and 134 million tons by 1975. FAO estimates the North American demand for paper and paperboard at 43.7 million tons by 1965 and 57.3 million tons by 1975.

All the signs reflect an extremely favorable business climate for the beginning of the proclaimed decade of prosperity although, as already indicated, labor problems — if remained unsolved — can have an adverse effect on the growth of our economy.

It seems ironical that in a democratic society, the powers of labor unions have been permitted to grow unchallenged to a point where they can be and sometimes are being exercised with complete disregard of the national economy or public morality.

It is therefore likely that public opinion in the sixties will insist upon drastic curtailment of such powers, despite the reluctance of our legislators who are currently concerned with the approaching elections. This curtailment is much overdue, for the powers held by labor unions are completely out of balance with those held by other organizations.



BOWATERS UTILIZES BY-PRODUCT WASTE AS FUEL

At Bowaters Carolina Corporation, Detroit RotoGrate Stoker, with 6 Detroit air swept spout refuse distributor feeders, installed under Babcock and Wilcox 2 drum single pass steam generator. Steam is produced at 850 psig, 900° F-T.T. Feedwater temperature 300° F. Combustion air temperature is 350° F.

Bowaters Carolina Corporation's new plant at Catawba, South Carolina uses a Detroit RotoGrate Stoker to burn bark refuse under a steam boiler. The installation is designed to produce 200,000 pounds of steam per hour when burning bark alone.

Costly waste disposal measures, which in years past were common to pulp mill operation, have been eliminated.

Provision is made for future firing of coal either in conjunction with bark or separately, and 275,000 pounds of steam will be produced with this combination. Peaks of 300,000 pounds of steam are anticipated.

Oil and gas burners in the furnace walls are presently used for auxiliary firing if refuse fuel is not available in sufficient quantity to supply the demand for steam.

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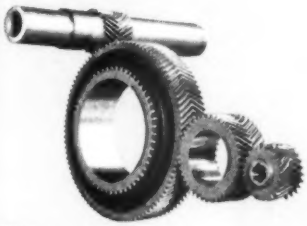

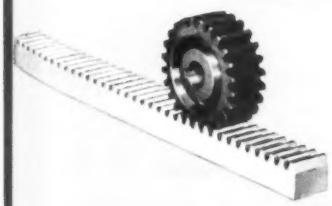

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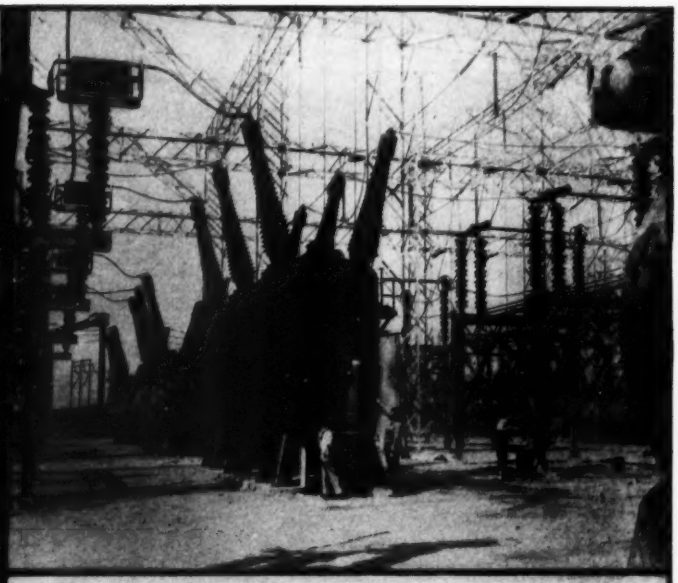

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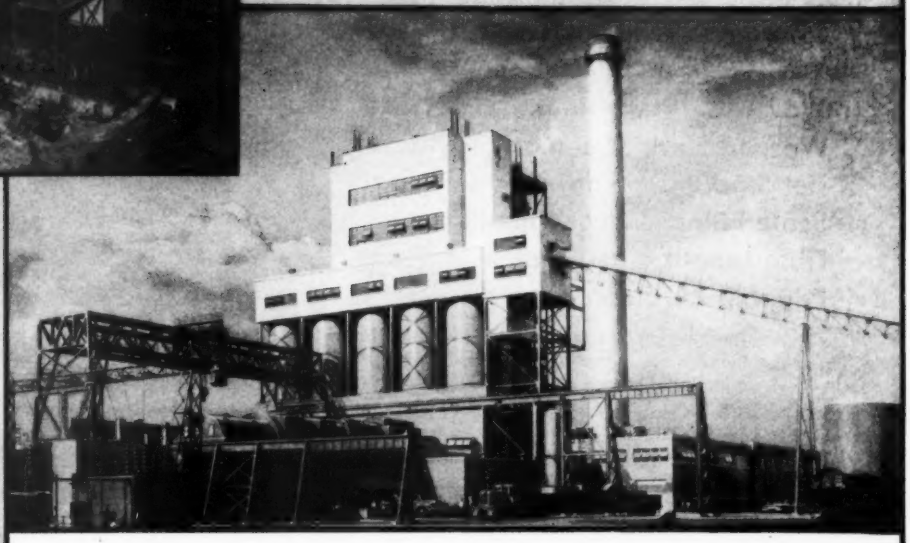

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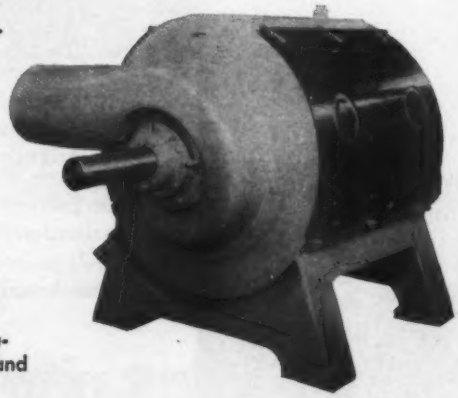
The new Impco Centrifugal Pulp Screen is the latest example of the progress made toward the ultimate in low cost quality screening. This screen incorporates many improved principles and features such as:

- — a stock inlet allowing direct top, bottom, front or rear infeeding which simplifies installation piping;
- — a tangential inlet which changes flow direction from linear to rotating, yet retains velocity head;
- — a special stator which provides uniform internal distribution of pulp;
- — a patented high-efficiency rotor which increases capacity without additional horsepower;*
- — a bottom accepted stock outlet permitting all sub-floor piping;
- — a full length quick-opening door for routine accepted stock sampling;
- — an accessible rejects outlet for tailings inspection or sampling.



These features are resulting in peak capacities and high discharge consistencies at lowest horsepowers. Reject richness is readily controlled. Engineered simplicity is characteristic of the entire line of Impco Centrifugal Screens which require very little operating attention and mechanical maintenance.

* U. S. Patent No. 2,845,848.

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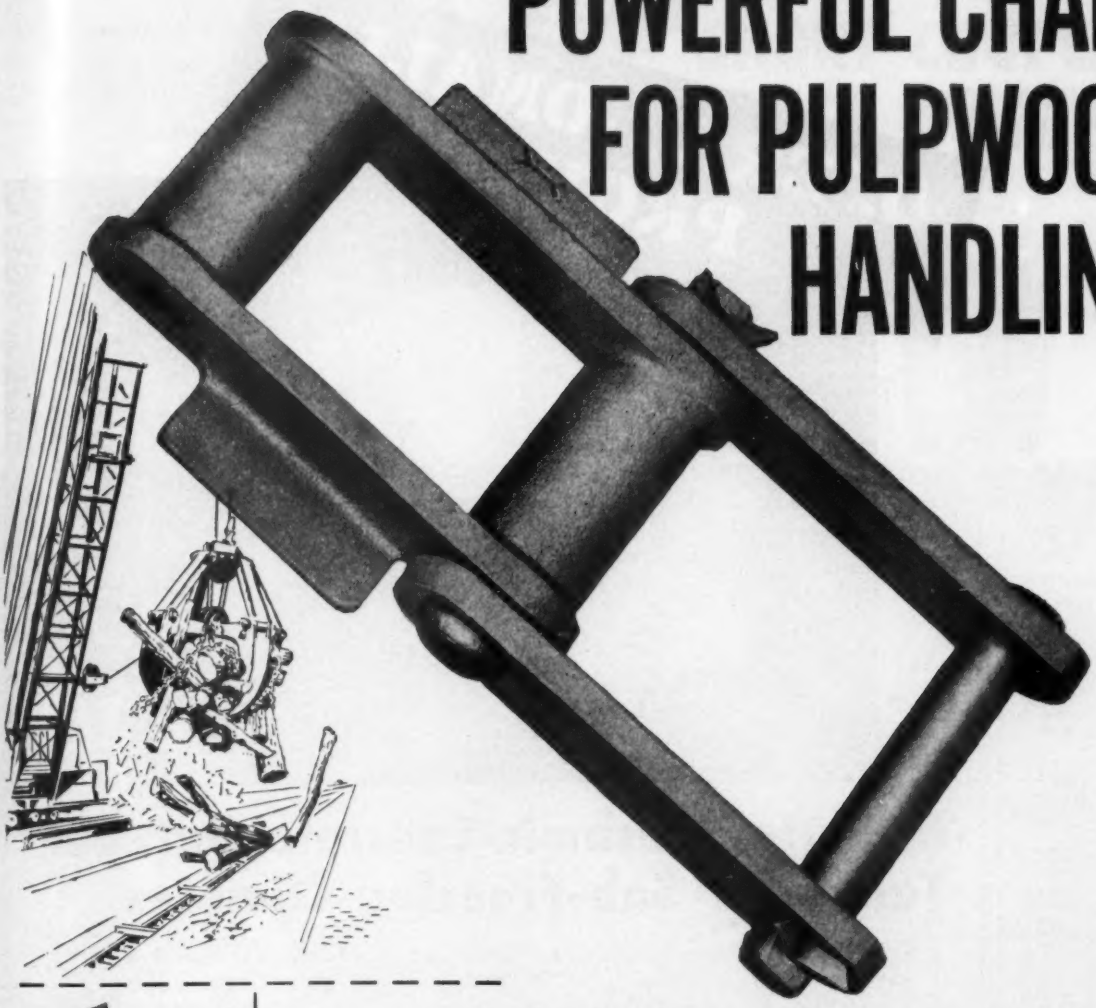
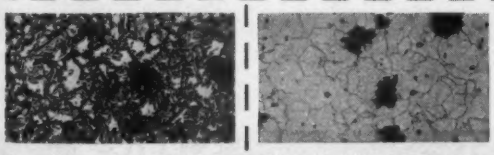


Attachments are available to suit a variety of conveyor applications.

File-hard surfaces of Flint-Rim sprockets help maintain efficient, dependable performance of chain and sprockets . . . prolong chain life.



Promal or file-hard Promal chain can be furnished for unusually abrasive conditions. Dark areas in Promal structures (left) show stronger, stiffer reinforcing material. Malleable (right) shows white "free-iron," black is soft carbon nodules.

Broad sliding surfaces of Link-Belt C-132W chain hold up longer on drag conveyors

Yes, with its broad top and bottom surfaces, Link-Belt C-132W chain is particularly resistant to the sliding wear encountered on carrying and return runs of drag conveyors. This high durability pays off in low maintenance, minimum shutdowns.

C-132W chain combines cast center links with steel sidebars connected by steel pins — offers ample, live joint bearing area to withstand pulpwood punishment. For further facts, contact your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your phone directory. Or write for new Catalog 1050.

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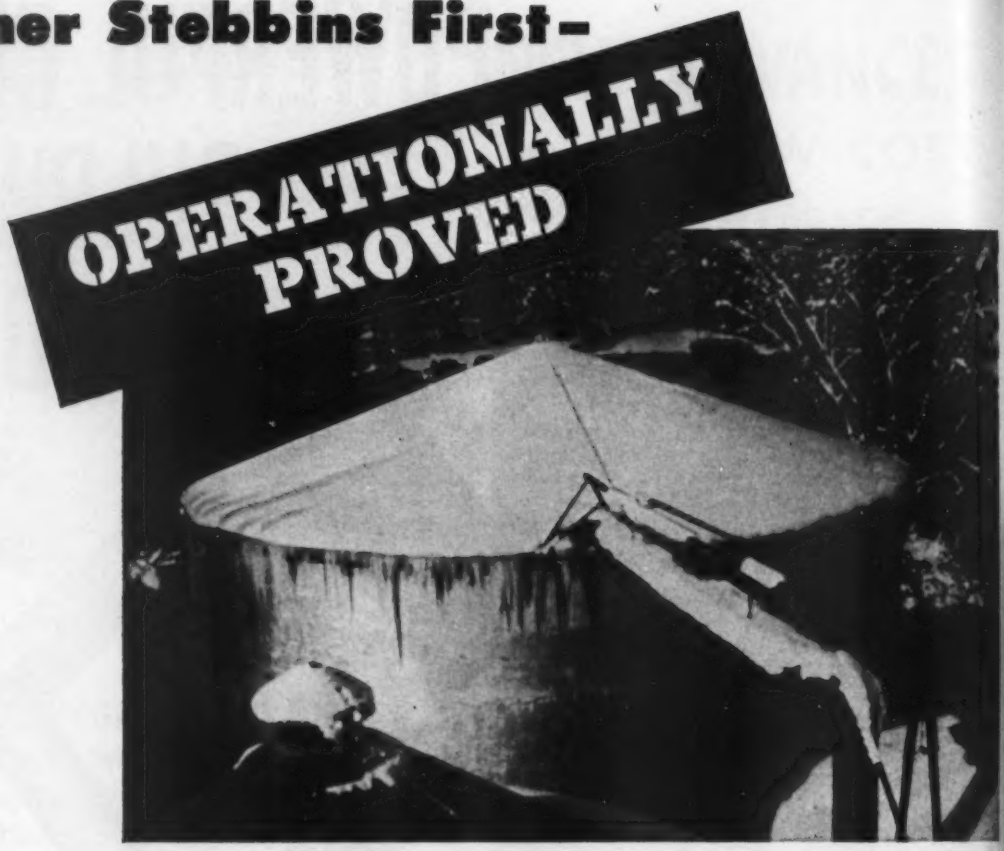

Insulated Ceramic-Concrete Outdoor Tanks for Sub-Freezing Climates

The tank illustrated, located near the Canadian border, has been through two winters carrying stock at 4% consistency. With no addition of heat, there has been no freezing—no adherence to the inner walls.

Perfect for outdoor storage of acids, liquor and pulp slurries in locations where extreme temperature changes are commonplace, Stebbins insulated tanks conserve heat, decrease the hazard of freezing and provide more uniform liquor and stock temperatures for operations. Cost compares with that of insulated steel, wood stave and other materials, AND—the interior surface can be of tile or brick with proper joint material for full corrosion resistance.

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Feature articles

Hammermill's $20,000,000 growth program completed

HARRY VANCE*
Project Engineer

Impco's continuous digester is the highlight of Hammermill's expansion program which also included addition of a new wood room and new boiler plant.

THE PRESENT major growth program represents a most progressive period in the 60-year history of Hammermill Paper Company. The project started three years ago after completion of a Neutracel pulp mill which enabled Hammermill to produce fine papers from hardwood. The Rust Engineering Co. of Pittsburgh, Pa., engineered and constructed both the original hardwood pulping operation and the expanded facilities under the $20,000,000 growth program.

The growth program was made up of the following major phases:

1. New hardwood wood room and doubling of Neutracel pulpmaking and bleaching facilities.
2. New four-story sulfite pulp mill building for processing softwood fibers.
3. Tripling the size of finishing room.
4. Boiler plant addition.
5. New administration building.

Dr. Donald T. Jackson, vice president and technical director, Mr. Kurt C. Neuenfeldt, chief engineer, assisted by Scott S. Hoffman, manager of manufacturing services, guided Hammermill's Engineering Department in their coordination with Rust which supervised the entire project. H. W. Vance, who was in charge of the original Neutracel installation, was project manager for the growth program. Because of the bulk of the work and the time element involved, five Rust project engineers were assigned to the design work.

Allegheny Industrial Electrical Co. Inc., performed the electrical work for all phases except the new administration building.

New wood room

New wood room and wood yard facilities were installed to process hardwood. Logs are conveyed from the yard by a 300-ft. steel plate flume and are fed into the wood room by jackladder. There are two 12-ft. dia. barking drums of extra heavy construction to withstand the battering of the hardwood logs. An assortment of belt and flight conveyors carries the logs, chips and bark through the various phases of chip preparation. One of the features is the flexibility of the sorting belts to reprocess or return the peeled wood for storage. The sorting belt discharges logs directly to a 96-in. diameter, 12-knife cutter. Accepted chips are conveyed pneumatically through overhead pipelines to the Neutracel plant. Bark waste is conveyed to the bark hog and will be carried pneumatically through overhead pipelines to the new boiler.

The aluminum-covered building is steel framed. It has an 8-ft. high, concrete block base wall below the aluminum sandwich-type paneling. The built-up composition roof rests on precast slabs. Interior siding is perforated to help deaden the noise of the debarking and chipping process. Lighting, heating, plumbing and sprinkler systems were designed with low cost maintenance in mind.

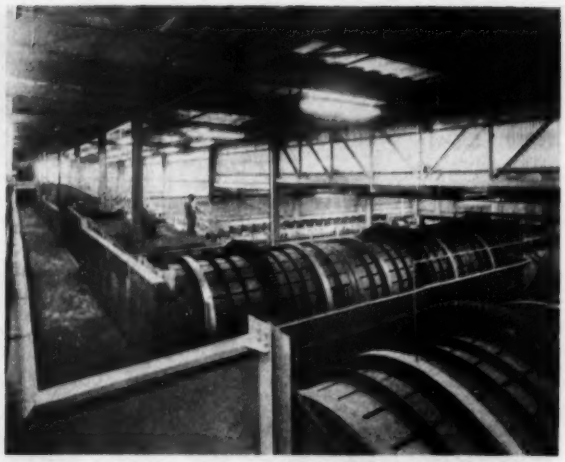
Provisions have been made in the building foundation for installation of one additional barking drum and chipper.

New continuous digester

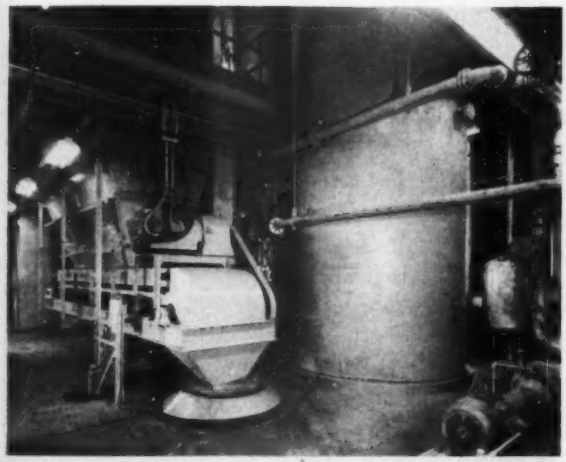
The new digester is an important part of Hammermill's long-term expansion program which will increase their capacity for production of hardwood pulp by the Neutracel process. The new continuous digester has these features: equipment sized for 250 tons per day; cooking liquor is of sodium base; downflow pre-retention vessel; pressurized upflow reactor;

*In cooperation Hammermill Engineering Department.

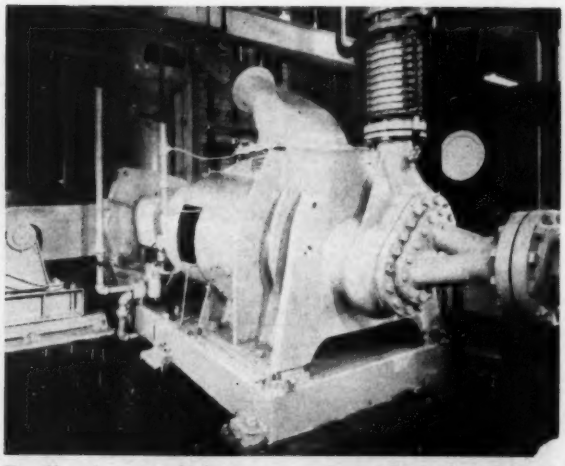
Exterior view of new woodroom.



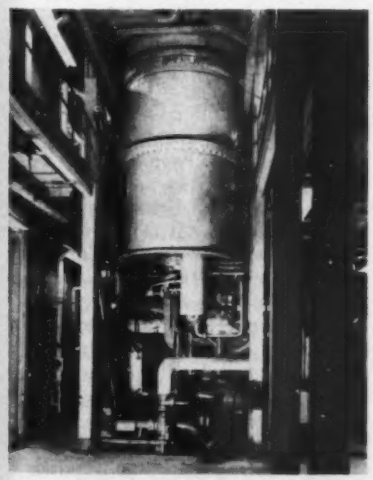
D. J. Murray Co., 12-ft. dia. barking drums.



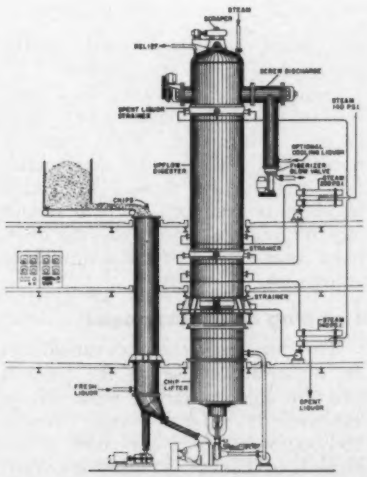
View of reactor and chip weigh hopper with apron conveyor which feeds chips into impregnator.



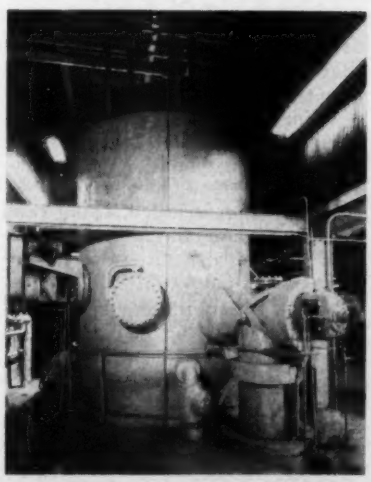
The Skew-Jector—a high pressure seal at infeed, through which chips are pumped into chip lifter.



View of chip lifter, Skew-Jector, and impregnator recirculation pump.

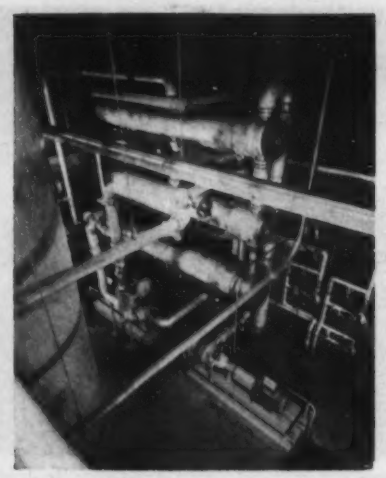


Impco digester shown in simplified flow sheet form.

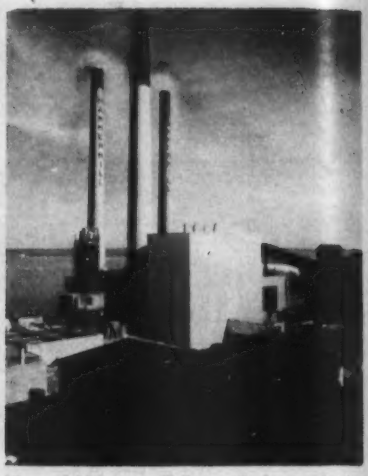


Top of Impco upflow continuous digester with top of discharge vessel on right.

View of fiberizer blow valve mounted on bottom of discharge vessel.

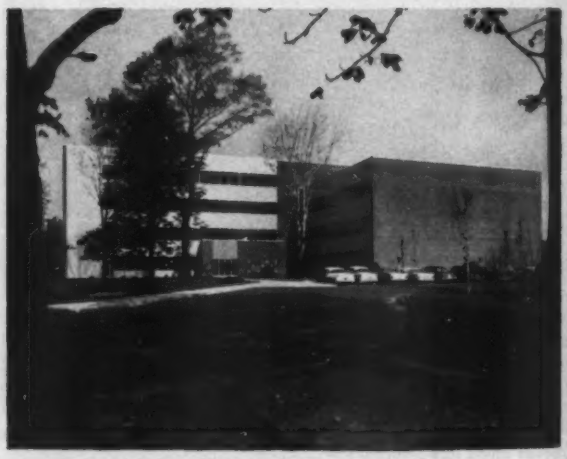


Struthers Wells heat exchangers and Goulds' circulation pumps.



View of Hammermill Paper Co.'s new boiler plant.

Expanded finishing area.



Hammermill's new administration building.

new type of chip lifter; liquor and chips flow independently; and consistent quality control.

Numerous pulp samples have been taken from the new digester over the periods it has been in operation. These have been bleached in the laboratory and evaluated. In all cases the strength and other properties have been substantially the same as for batch-cooked pulps.

A flow sheet drawing and photographs illustrate the pulping process using the new continuous digester.

Sulfite mill modernization

The present sulfite mill has been modernized to permit process flexibility giving wide variation in pulp properties and to improve operating efficiency. The details of this mill are not being publicized until certain patent applications are resolved.

Equipment was installed in a new, four-story, brick building of steel frame construction with concrete floors and a built-up roof over insulation and precast slabs. The sulfite building is equipped with a service elevator and has a hoist bay and overhead crane as part of the maintenance equipment.

Finishing room expansion

The finishing room expansion is an important phase of the growth program incorporating some major innovations. Total area covers 234,600 sq. ft. and the room is designed to handle 450,000 lbs. during one 8-hr. shift.

Each section of the building can best be described by the function it serves.

Roll storage and cutters. The storage area for paper machine roll production has been increased to 2,000-ton capacity in a new 44-ft. by 304-ft., two-story brick building of well-type design. It is built against the east wall of the old finishing room. The interior is open from ground level to roof so that rolls can be stored on end by means of a 5-ton, heavy-duty grab crane. There are roll loading and unloading platforms and four delivery bays opening upon the operating floor.

Sheeted storage and conveyors. A major portion of the new finishing room is the operating building ex-

Principal Equipment Installed at Hammermill

Engineering and Construction Contractors: Rust Engineering Co.

Woodroom

Barkers-2, 12-ft. 0-in. dia. x 67-ft. 6-in.	D. J. Murray Co.
Chip conveyor	Rader Pneumatics Co.
Chip crusher	Waterville Iron Works
Chip screens	Orville Simpson Co.
Chipper, 96-in. knife	Carthage Machine Co.
Pumps	Goulds, Weinman & Warren

Continuous digester

Chip bin	Stebbins Engineering & Mfg. Co.
Continuous digester	Improved Machinery Inc.
Conveyors	Continental Gin Co.
Heat exchangers	Struthers-Wells Corp.
Plate feeder	Link-Belt Co.
Pumps	Goulds Pumps Inc.

Sulfite mill

Bleach towers	Sharpsville Steel Fabricators
Bleach washers	Improved Machinery Inc.
Centri cleaners	Bauer Brothers Co.
H. D. stock tank	Hammond Iron Works
Pumps	Goulds, Warren & Weinman
Refiners	Sprout Waldron Co.
Stock reclaiming system	Improved Machinery Inc.
Tile linings	Stebbins Engr. & Mfg. Co.

Finishing room

Conveyors	Logan Company, Matthews Conveyor Co.
Paper trimmer	Harris-Seybold Co.
Roll cranes	Cleveland Crane & Engr. Co.
Scissors lifts	American Mfg. Co.
Sheet cutter	Masson-Scott Ltd.

Boiler plant

Ash handling system	United Conveyor Co.
Boiler and stoker	Riley Stoker Corp.
Coal scales	Stock Equipment Co.
De super heating pump	Aldrich Pump Co.
Dust collector	Hagan Chemical & Controls Co.
F. D. Fan	Westinghouse Corp.
F. W. Control. combustion control and boiler instruments	Copes-Vulcan Division of Blaw-Knox Co.
I. D. Fan	Buffalo Forge Co.
Siding	Elwin G. Smith Co.
Structural steel	Roger Structural Steel Co.
Thermal insulation	Gram Asbestos Co.
Water treating equipment	Cochrane Corp.

Administration building

Acoustical ceilings	Davis-Fetch Co.
Asphalt tile work	J. M. Tile Co.
Electrical	McNerney Electric Co.
Floor and roof deck	Inland Steel Co.
Heating and air conditioning	R. E. North Co.
Lathing and plastering	McNulty Brothers Co.
Moveable partitions	Hauserman Co.
Painting	Arthur Painting Co.
Passenger elevator	Westinghouse Electric Corp.
Paving	Charles H. Fry Construction Co.
Plumbing	Coleman-Good Inc.
Roofing and damp proofing	Felheim Heating & Roofing Co.
Structural steel	Bethlehem Steel Co.
Window walls	Pittsburgh Plate Glass Co.

tension with space and equipment for the cutting, storage, inspection, trimming and packing of paper in sheeted form. The main operating floor has 80,000 sq. ft. additional floor space. This new arrangement includes a complete overhauling of all of the folio and cut-size conveyors to increase their flexibility. Powered belt conveyors facilitate movement of packed cartons.

Mezzanine. Offices and a conference room occupy the center section of the mezzanine dividing spacious locker and rest room facilities for the men and women workers. An observation gallery behind gray-tinted glass windows for use by visiting groups has the advantage of offering the best over-all view of the operating floor.

The finishing room floor and equipment layout was designed by Hammermill's Engineering Department. Rust designed and constructed the building.

Boiler plant addition

Steam for the new pulping installation is supplied by a new boiler plant addition. The boiler burns both bark and coal on a common grate and is expected to produce 25 per cent of Hammermill's steam requirements when firing bark and coal simultaneously. It is estimated that 86,000 lbs. of steam per hour actual evaporation will be obtained from coal and 120,000 lbs. from bark. More bark will be burned than coal. The dual-rated boiler has a predicted capacity of 206,000 lbs/hr. on coal alone at 675 psi, 760° F.

The boiler is designed to burn unhogged bark, but bark from the new Neutracel wood room will be hogged before being air-conveyed through a Rader 1700-ft. long, 14-in. dia. pipeline. Bark will be fed directly into the furnace through a bark proportioner. There will be no bark storage at the boiler.

The boiler combustion system is designed to adjust automatically to changes in moisture and b.t.u. content of the two fuels. Natural reactions, created within the boiler by these changes, adjust the control equipment. The boiler is base-loaded and has its own new 258-ft., reinforced-concrete Rust chimney.

The boiler feed water treatment plant was revamped to meet the demands created by the increase in steam generating capacity. The original two-stage, hot phosphate system was converted to a hot lime zeolite type providing additional capacity and better quality feedwater.

Building additions to house this equipment consist of steel frame with insulated, sandwich-type aluminum panel siding with built-up roofing on metal roof deck. Grating floors and walkways are provided for access to equipment. An elevator was installed to serve all floor levels in the new building.

New administration building

Since 1898, Hammermill has expanded its office ten times and in recent years used former residences around the plan grounds as a decentralized office arrangement.

A modern 61,500 sq. ft., four-story building now serves as the administrative headquarters of Hammermill Paper Co. and all of its divisions, subsidiaries and affiliates.

An important feature is the use of color. Alternating yellow insulated glass panels and gray tint, double glass window set in aluminum framing, cover most of the exterior walls. The flanking walls are of red brick masonry. Surrounding the administration building are lawns with stately maple trees and new shrub planting. There is a large parking area adjacent to the building.

The interior design and decoration of the building permits efficient work in attractive, air-conditioned surroundings. Great emphasis had been placed on eye appeal and comfort. Noise and eye strain are further eliminated by acoustical ceiling, asphalt tile flooring and recessed fluorescent lighting.

The new building was designed by Daniel, Mann, Johnson and Mendenhall, Los Angeles, Calif., and contructed by Rust.

Depreciation reform and a balanced budget

MAURICE E. PELOUBET*

A non-inflationary depreciation reform is proposed that causes little or no decrease in revenue in the first year, and increased revenues in subsequent years.

THE INDIVIDUALS and industries working on depreciation reform are as much interested in and as deeply committed to fiscal soundness and a balanced budget as the President and the Bureau of the Budget.

The American Economic Foundation, a non-profit organization to which most of the companies interested in depreciation reform have been contributors for many years, has been an outstanding advocate of fiscal and economic soundness and has been, for some time, pointing out the seriousness of the depreciation problem.

Price Waterhouse & Co., and our firm have been working on the accounting and statistical side of this problem for several years. Lately our firms have been working intensively on the revenue effects of depreciation reform.

We have come to the conclusion, based on Treasury statistics, the McGraw-Hill Publishing Co. industrial surveys and our own statistical studies in certain industries that some, at least, of the methods of depreciation reform advocated by witnesses before the Ways and Means Committee in January, 1958, would result in little or no immediate loss of revenue and would increase the revenue in later years.

Value of depreciable property

Using round figures for 1957, the historical cost of depreciable property is $315 billion and annual depreciation allowed for Federal tax purposes is $15 billions, an average rate of about 4¾ per cent.

Current value of depreciable property is $433 billion. The same rates applied to the current value would produce $5 billion more depreciation. This is the gross depreciation deficiency.

It is assumed that legislation for full replacement depreciation will not be passed at this time. None of the other methods proposed in January, 1958, would produce an additional depreciation equal to more than half the full deficiency.

However, $2.5 billion or $3 billion would be a considerable revenue loss and one which, no matter how well justified economically or morally, would have a severe budgetary effect.

Basic assumptions for "no-revenue-loss"

To justify the statement that there would be little or no revenue loss in the first year of depreciation reform, and that there would be an increase in revenue in subsequent years, we must make certain basic assumptions: (1) that any funds arising from additional depreciation allowed over that available under the present statutes and regulations would be spent for depreciable property; (2) that the funds provided by the additional depreciation would be spent in addition to commitments already made or programs already under way; (3) that expenditures for depreciable property go into the total stream of income; and, in the form of wages, material purchases, salaries and profits, generate taxable income.

Under the method known as reinvestment depreciation, all the additional funds would be spent for depreciable property because this is a condition of granting the additional allowance.

It is rather difficult to determine exactly what funds provided by increased depreciation would be spent in addition to what would otherwise have been spent on existing programs and commitments.

Modernization, improvement and expansion programs, before these are reduced to actual contracts for machinery, equipment and construction, are mere expressions of intention and can be delayed, accelerated, reduced or expanded as conditions seem to justify.

It is, therefore, highly probable that the possibility of obtaining tax-free dollars for modernization or replacement would, in itself, be a condition which would bring indefinite but desirable projects into being and tend to prevent the abandonment or reduction of other programs.

When surveys are made to determine the future plans of industrial companies, it is the usual experience that taxpayer's estimates of what will be spent are on the low side, and it is also the experience that while, perhaps, in total and in general, these estimates are reliable, they are subject to considerable fluctuation because of events which take place after the estimates are made.

In spite of all this, however, we do have reasonably reliable estimates. The latest McGraw-Hill survey states that one-half of the companies reporting said that any additional funds which they might receive through increased depreciation would be spent on depreciable property in addition to what was planned already.

About $26 of tax revenue for the Treasury is generated by each $100 spent by business for equipment and machinery. Conversely, at present corporate rates the Treasury would lose up to $52 income tax on each additional $100 of non-taxable depreciation allowance. This loss could be

(Continued on page 709)

*Senior Partner, Pogson, Peloubet & Co., Certified Public Accountants, New York

Present status of atomized suspension technique

Beaconsfield's $35,000 AST unit for sanitary sludge removal.

THE ATOMIZED suspension technique was developed by the Pulp and Paper Research Institute of Canada, in the course of a research project aimed at recovery of chemicals from the spent liquors of pulp mills. The new procedure was invented and patented by Dr. Wm. H. Gauvin, Head of the Chemical Engineering Division of the Pulp and Paper Research Institute of Canada. Dr. Gauvin's work which led to the development of AST was started in 1951 and concerned itself with the application of the fluidized-bed technique in which solids, in powder form, are carried in a turbulent gas suspension. The objective of this investigation was the recovery of sulfur from spray-dried, spent pulp mill liquor.

By 1953, the sulfur shortage in Canada was over and Dr. Gauvin then reasoned that, instead of beginning with a powder in the fluidized condition, studies should be made of atomizing dilute solutions of spent liquor directly into a heated reactor as a means of recovering pulping chemicals and preventing stream polution.

It was soon realized that the application of AST at a full mill scale would require an expensive and rather complicated array of equipment and that many of the problems of such application still remain to be worked out.

Meanwhile, the use of AST for disposing of sanitary sludges appeared to be a simple application. This was tried and it culminated in the development of a new, simple, rapid, and relatively cheap method for dealing with sanitary sludges. This method is now in operation at Beaconsfield, Quebec, a residential suburb of some 7,000 population.

What is AST and how does it work?

The technique consists of spraying an atomized mist of either a true aqueous solution or an aqueous slurry into the top of an empty tower whose wall is maintained at a high temperature. The heat required to keep the wall at a high temperature may be applied by electrical heating elements, or by the burning of oil or gases in a chamber surrounding the tower. The moisture of the sprayed liquid inside the tower immediately flashes into superheated steam which becomes a carrier vapor as the droplets move down the reactor under the influence of gravity and the pressure of the evolved steam. The droplets evaporate further, and, in a few seconds, the dissolved or suspended solids present in the feed liquor become dry particles suspended in a vapor of their own creation.

Dr. W. H. Gauvin
Inventor of the AST

This cloud of particles in steam has two unique features. It moves down the column without major turbulence. Also, since there is no film of gas absorbed on the surface of each tiny particle in suspension, the speed of heat absorption by the particles and their speed of chemical reaction after the drying stage are increased several-fold.

After drying, the solids may be whirled out of the suspension as a dry powder by cyclone separators at the bottom of the reactor. The steam produced may be condensed in a condenser and used as hot water; or it may be passed through heat exchangers to remove the heat for utilization; or it may be passed along to be used directly as plant steam at a pre-determined pressure.

As the dried solid particles move down the column of the reactor, they may be subjected to thermal decomposition or they may be reacted with a

(Continued on page 748)

Engineering developments rank high at Chemical Exposition

New glass-lined pipe is cut to size at site of installation.

THE 27th Chemical Exposition, held in New York from November 30 to December 4, attracted some 50,000 business executives, engineers, and other specialists. The feeling of optimism was high and there were unmistakable signs of an accelerated business activity anticipated for 1960, provided of course the steel strike would not be resumed upon the expiration of the 80-day Taft-Hartley injunction.

About 550 exhibitors displayed some 300 different categories of products, including chemicals and equipment for the chemical and allied industries. Equipment manufacturers were in considerable majority and their products, while basically mostly the same as exhibited in previous years, showed marked improvements in design, performance and endurance characteristics.

New glass linings

A revolutionary new glass-lined pipe that can be field-cut to required length and that has more than twice the glass thickness of previous glass-lined pipes was exhibited by Pfaudler, Division of Pfaudler-Permutit Inc. The pipe, lined with $\frac{1}{8}$-in. thick borosilicate glass, is available in $1\frac{1}{2}$, 2, and 3-in. dia. sizes and is designed to withstand pressures of 150 psi. It is also resistant to all acids, with the exception of HF.

Due to the novel quality of the pipe that permits field cutting and threading, precise piping layouts and specifications by interested mills are no longer required. Cutting and threading equipment includes a dry abrasive cut-off wheel, a special threading die, and a small fire-polishing furnace. Special Teflon envelope gaskets permit assembly with standard glassed ductile iron and gray iron fittings and valves as well as Glasteel tank nozzles.

The new Glasteel pipe has recently been installed successfully in the bleach plant of a prominent Canadian sulfite mill.

Other Glasteel equipment includes a 4-ft. dia. blender equipped with variable speed drive and quick opening port. All interior surfaces of the blender have an extremely smooth, fired, glass finish. A new Glasteel reactor with 30 per cent more thermal shock resistance and 20 per cent greater resistance to abrasion than shown by previous glassed steels is available in sizes of 300-4000 gal. and can be used in operations under vacuum conditions and up to 100 psi pressures.

Other equipment exhibited by Pfaudler includes a dimpled-jacket stainless steel reactor featuring new drives and turbine agitation. The "dimpled" jacket is a unique Pfaudler design which saves up to 20 per cent in materials cost compared with conventional jacketed units.

A new high-temperature glass lining, Glascote 778, is a development of A. O. Smith's Glascote products division. Glascote 778 has good resistance to thermal shock and also shows better resistance to 0.5 per cent sodium hydroxide solution at 200° F, as well as to 10 per cent HCl at 350° F than borosilicate glass, according to A. O. Smith.

Heat exchangers

A new 14 sq. ft. tantalum shell and tube heat exchanger with Glasteel bonnets was exhibited by Pfaudler. The heat exchanger has a 6-in. carbon steel shell, 0.020-in. thick tantalum tube sheet lining, and 0.015-in. tantalum tubes. The heat exchanger is designed for use in high corrosive service at 75 psi pressure. Tantalum, as is well known, has excellent corrosion resistance as well as excellent heat transfer characteristics.

Another type of heat exchanger, designed for use in corrosive service, are the Pyrex brand shell and tube heat exchangers with 60 sq. ft. capacity developed by Corning Glass Works.

These heat exchangers contain bundles of 31 Pyrex Brand glass tubes of $\frac{3}{4}$-in. dia., can be mounted horizontally or vertically, and can handle operating temperatures up to 200° F on the shell side and up to 375° F on the tube side at working pressures up to 20 psi.

Teflon envelope gaskets are used for assembly with glassed fittings and valves.

Glass drainline

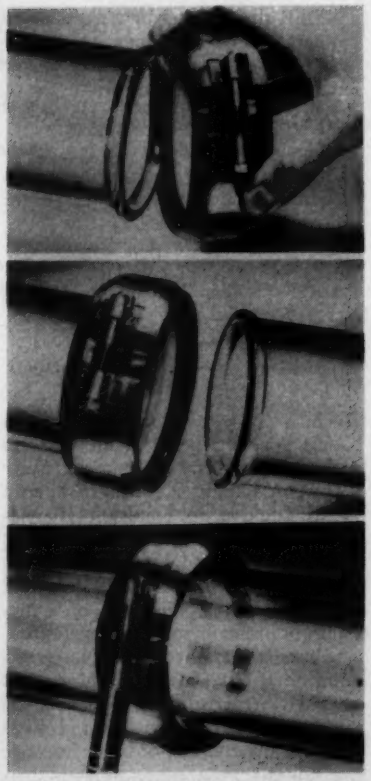
Corning Glass also exhibited a lifetime glass drainline system featuring simple, one-piece couplings designed to cut installation time and cost and to eliminate failure due to corrosion or joint leakage. The pipings and fittings are made of hard, low-expansion borosilicate glass, while the coupling consists of a stainless steel shell, a rubber sleeve, and a liner of Teflon 100-X which is as corrosion-resistant as the glass.

The drainline system is designed for pressures up to 15 psi and temperatures up to 250° F.

Materials handling

Sales in materials handling equipment are expected to increase at the rate of 6 per cent per annum over the next ten-year period, as a result of the ever growing demand for such equipment in a determined effort to increase productivity. Accordingly, the exhibitors showed a great variety of materials handling equipment featuring many improvements in conveying, feeding, fluidized systems, weighing, and container handling.

A new hopper activator featuring separate mecnanical vibrating and pneumatic mechanisms was exhibited by Vibra Screw Feeders Inc. This hopper activator will guarantee reliable flow of dry materials from any hopper or storage bin. It consists of a vibrating shaft with attached vibrating arms, which is centered vertically from the base to the top of the hopper.



Pyrex brand lifetime drainline system.

New Pyrex brand tube and shell heat exchangers.

Vibra Screw Feeders Inc. also showed a gravimetric feeder for controlling feed rates of all dry materials at rates of a few ounces per minute to 100 tons per hour. The feeder consists basically of a primary feeder, a weigh screw and a distributing screw. Its operating principle combines a vibrating screw with vibration of the hopper, trough and tube. The feeder can deliver predetermined batches directly into the process at timed intervals or on a continuous weight controlled basis.

Richardson Scale showed its new formula-capsule which takes the hu-

(Continued on page 748)

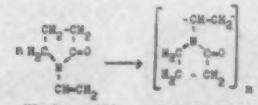
Adhesives in the paper industry

Part VII (Continued) — Miscellaneous resin adhesives

UNDER the heading of miscellaneous synthetic resins of interest to the adhesives industry, a wide variety of materials may be mentioned.

Polyvinylpyrrolidone

Polyvinylpyrrolidone is a newer plastic prepared by the polymerization of vinylpyrrolidone according to the following equation:

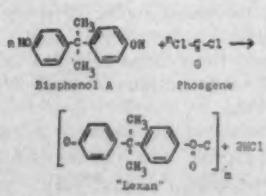


Vinylpyrrolidone — Polyvinylpyrrolidone

This resin is said to be an excellent bonding agent for smooth surfaces such as glass, metal and plastics. Since it is water soluble, it is also of interest as an additive to emulsion-type adhesives. Likewise, it may be added to adhesives dissolved in solvent. It imparts oil and grease resistance and helps control the viscosity of either water or organic solvent based products. For adhesion to glass it is recommended that five per cent or less of polyvinylpyrrolidone be added to vinyls, polyesters, phenolics and other synthetic materials in order to improve the adhesive character. Polyvinylpyrrolidone is also said to be applicable for use on labels and adhesive tapes.

Lexan

Still another new resin introduced recently is "Lexan", which is a polycarbonate resin made by the condensation of bisphenol A and phosgene. It will be recalled that bisphenol A is also the starting material for the epoxy resins. The formula showing this condensation is indicated below.



Bisphenol A — Phosgene

"Lexan"

Lexan is a thermoplastic material which is said to have excellent adhesive characteristics, providing the base for structural adhesives with high heat distortion points for metals and other substrates.

Polyox resins

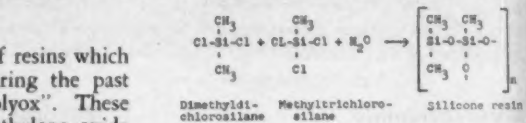
Another new family of resins which has been announced during the past year is known as "Polyox". These resins are polymers of ethylene oxide but, unlike previously known polymers, they have molecular weights which may be as high as several millions. They are water soluble with high thickening efficiency. They have good resistance to oils and greases and are tough, flexible and heat sealable. These new resins are also said to be compatible with starch and polyvinyl acetate. One particular property which may be useful to the adhesives chemist is the ropy or stringy consistency of water solutions of the Polyox resins. This property is not normally observed in water soluble resins due probably to their lower molecular weight.

Polyamide resins

Various polyamide resins find application in adhesive formulations. Although most of the nylon types are too insoluble to form good adhesives, there are certain soluble derivatives such as the N-alkoxy modified nylons, which are produced by the reaction of nylon with formaldehyde in the presence of alcohol. These soluble products enjoy some adhesive usage. A different type of polyamide resin results from the condensation of dimerized linoleic acid with a diamine such as ethylene diamine. These resins are useful as heat-seal adhesives for a variety of substrates including plastic films and cellulosic products. They are also useful for metal bonding and may be combined with the epoxy resins to form structural adhesives.

Silicone resins

The silicone resins which were introduced over a decade ago are useful adhesives because of their electrical properties and because of their excellent high temperature properties. The following reaction is typical for the formation of a silicone polymer.

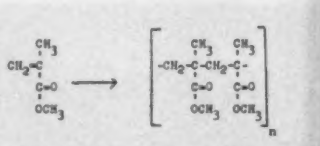


Dimethyldichlorosilane — Methyltrichlorosilane — Silicone resin

The silicone resins have excellent water resistance and are indicated for use as adhesives for metal to metal, metal to glass and glass to glass layers, particularly where there is need to withstand high temperatures.

Acrylic resins

Acrylic resins based on the polymerization of methyl acrylate or methyl methacrylate, according to the equations shown, are also of interest to the adhesives manufacturer.



Methyl methacrylate — Polymethyl methacrylate

These resins are available both as latices and in the solid form. They can be dissolved in solvent to form lacquer-type adhesives. They are useful as adhesives for glass, and have actually been used as the plastic interlayers in safety glass. They are also useful adhesives for wood, cellulosic substances and metal.

Coumarone-indene and hydrocarbon resins

Of interest also to the adhesives manufacturer are the coumarone-indene resins and related petroleum resins which find application as hot melt adhesives, as adhesives for rubber and as compounding ingredients for

(Continued on page 709)

Tall oil rosin from the tall oil industry*

JOSEPH M. WAFER**

The continuing decline in wood and gum rosin production will provide an added incentive for tall oil rosin output and the needed expansion of fractionation capacity.

WHOLE TALL OIL is a mixture of rosin acids and fatty acids with minor quantities of sterols, higher alcohols and other nonacids. The rosin acids resemble those of commercial rosin, the fatty acids are mostly oleic and linoleic, like the fatty acids of soybean oil.

The properties of fatty and rosin acids vary considerably with the kind of pine wood used and with the details of wood handling operations. Whole tall oils have a rosin acid content ranging from 35 to over 55 per cent, fatty acids contents from 60 to 35 per cent, and sterols, etc., contents from 5 to 10 per cent.

Tall oil rosin

In 1958 the U. S. Pulp Producers Association reported the production in the Southern States of 9,203,726 tons of sulfate pulp from pine (paper grades).

Projected at rates of 70 to 90 lb. of crude tall oil per ton of pulp would provide 322,130—414,168 tons of crude tall oil. In turn, assuming that sufficient fractionation capacity were available, and a yield of 35 per cent of tall oil rosin, that quantity of crude tall oil would have provided 112,746—144,959 tons of tall oil rosin.

To this potential would be added the 30,000 tons of crude tall oil that is produced as a result of using pine wood in the production of the dissolving pulps.

Actually, in terms of crude tall oil, Pulp Chemicals Association reported a total production by its members and purchases from non-members of 331,612 tons of crude tall oil in 1958. Again assuming a yield on the average of 35 per cent, this would have furnished a source of tall oil rosin equivalent to 116,064 tons.

The reports issued by the Department of Agriculture, for the full calendar year 1958, indicate a production of tall oil rosin equal to 73,682 tons. We should recognize, however, that there are rosin fractions being taken off the distillation streams that are interchangeably used against gum rosin, wood rosin and tall oil rosin. However, because of the specifications contained in the revised Naval Stores Act, these fractions cannot be classed as tall oil rosin, and consequently not reported in any production figures. For this reason, the USDA figures are somewhat misleading as to the actual production of tall oil rosin.

Gum and wood rosin

Naval Stores data compiled over a fifty-year period, show the following production data for gum and wood rosin and, more recently, tall oil rosin.

Including the production of tall oil rosin in the Naval Stores year ending March 31, 1959, we have a total of 482,827 tons which compares with the production of 519,584 tons of rosin fifty years ago which at that time consisted entirely of gum rosin.

The constant decline in gum rosin production over the years and the indications of a similar situation developing for wood rosin production, conceivably led to the entry into the tall oil production field of a number of concerns in the Naval Stores industry in search of an alternative source of supply of rosin.

Such companies include Hercules Powder, Heyden Newport Chemical Corp., Monsanto-Emery, Gildden Co., Crosby Chemical Co. and Arizona Chemical Co. The latter is a jointly owned enterprise involving American Cyanamid Co. and the International Paper Co. American Cyanamid is a large factor in the production of rosin size and International Paper, of course, is a large consumer.

Availability of tall oil rosins

Let us review, then, what is currently taking place in the tall oil industry to see to what extent the availability of tall oil rosin from this industry might help to fill the gap caused by the constant decline in gum rosin production, and to what extent it might supplement the further losses that may be involved with wood rosin production.

Production of sulfate pulp (paper grades) from pine wood in the south for the first six months of the calendar year 1959, as reported by the U. S. Pulp Producers Association, totaled 5,209,933 tons.

Assuming yields of 70 to 90 lb. of crude tall oil per ton of pine pulp, this production offered a potential source of crude tall oil of 182,347-234,447 tons.

Again assuming adequate fractionation capacity and a yield of 35 per cent of tall oil rosin, this quantity of crude tall oil would have provided a source of 63,821 to 82,056 tons of tall oil rosin.

Production of crude tall oil and purchases from non-member com-

*Abridged from a paper presented at a meeting of the National Paint, Varnish and Lacquer Association.

**West Virginia Pulp and Paper Company, New York City.

panies as reported to the Pulp Chemicals Association for the first six months of the calendar year 1959, totaled 205,393 tons of crude tall oil.

Assuming a potential yield of 35 per cent of rosin, this would have provided a source of 71,887 tons.

The actual production of tall oil rosin for that six month period, as reported by the Department of Agriculture, totaled 46,322 tons.

Projecting crude tall oil production for the calendar year 1959, we come up with a potential tall oil rosin equivalent of 143,775 tons. However, if we conclude that the actual production will be double that of the first six months, then for the full calendar year of 1959 the tall oil rosin production would reach 92,643 tons. Again, the potential crude tall oil availability would be enhanced by the quantity that is available from the production of rayon and viscose grade pulps.

Considering that the production of gum rosin for the Naval Stores ending March 31, 1959, totaled 96,000 tons, and again taking into consideration that there has been a constant decline in the production of gum rosin, it may be that for the first time during the Naval Stores year ending March 31, 1960, tall oil rosin production will surpass gum rosin production.

The U. S. Pulp Producers Association indicates that the capacity in the Southern States for the production of paper grades of sulfate pulp for 1960 is 12,399,948 tons. Based on the relative growth over the years of sulfate pulp made from hardwoods and softwoods, they arrived at the following estimate:

Hardwood pulp capacity (sulfate) —833,263 tons.

Softwood pulp capacity (sulfate) — 11,566,685 tons.

Let us assume for the purpose of developing a potential estimate that the pulp mills in 1960 would operate at 100 per cent of capacity, producing 11,566,685 tons of softwood pulp. We then arrive at the 1960 potential range of 141,692 tons to 182,175 tons, depending on the yields per ton of pulp. In terms of the 1965 potential tall oil rosin capacity, according to the autor's estimate based on a Department of Commerce's report, would range from 166,551 tons to 214,137 tons again depending on the yield of tall oil obtained per ton of pulp.

For the Naval Stores year ending March 31, 1959, the production of wood rosin amounted to 307,481 tons.

To provide 307,481 tons of tall oil rosin, the amount of crude tall oil availability would have to total 878,-517 tons. This is based on a yield of 35 percent of tall oil rosin.

Now, translating this back in terms of pulp, and utilizing a yield of 90 lb. of crude tall oil per ton of pine pulp, it would be necessary to produce 19,522,711 tons of sulfate pulp (paper grades) utilizing pine as the source.

While the pulp and paper industry has continued to expand, it is not likely that we will see a production of this magnitude for some time. The output of the tall oil industry, therefore, will be unable to replace the production of wood rosin as reported for the Naval Stores year ending March 31, 1959.

To what extent there may be further increases in the utilization of hardwood for the production of sulfate pulp would likewise have an adverse affect on the potential crude tall oil availability in the future.

The incentive to increase production of tall oil rosin is provided by the fact that the market is already available due to the declining production of gum rosin and some indications of a lesser production of wood rosin.

Indications point to a currently insufficient fractionation capacity to take full advantage of the tall oil production potential. This situation will certainly be remedied, as there recently has been an announcement of a new fractionation unit to be installed in Louisiana that could process a minimum of 40,000 tons of crude tall oil annually. Two other expansions have been indicated that could probably process an additional quantity of approximately 25,000 tons of crude tall oil per year.

Economic considerations

The economics would indicate that, in the forseeable future, the rosin fractions of tall oil will command a greater price strength than the distilled or fatty acids, except where specialty products may be involved.

The upward price movement, announced for the fourth quarter of 1959 on wood rosin, of 90 cents per 100 lb. and further price increases on light grades of rosin size for the same period follows a previous decline in the price structure of distilled tall oil and fatty acids due to the competitive conditions in the price of soya bean oil. The latter competes with tall oil products in the protective coating industry.

The volume of tall oil rosin derived from the tall oil industry potentially would be just enough to meet the requirements for rosin size in the paper industry. For in the Naval Stores year ending March 31, 1959, government figures indicated that the paper industry consumed the equivalent of 142,-029 tons.

In the protective coating industry tall oil fatty acids have made considerable inroads due largely to the wide price fluctuation of soya bean oil with which it competes.

While the price structure of soya bean oil was going up, it made possible substantial applications of tall oil fatty acids in protective coatings because of the obvious economic advantage. However, now our industry faces an adverse situation in that the prices of soya bean oil have been moving downward and, to that extent, tall oil fatty acids may find it difficult to compete on the market.

With a bumper crop of soya in 1959 and the indications that cotton seed oil will sell at lower levels, it is possible that the price structure on soya bean oil may decline even further.

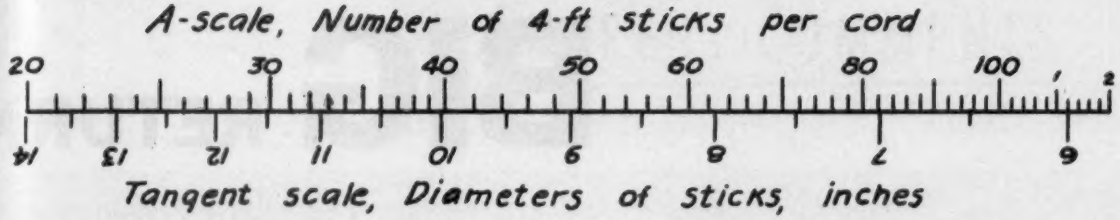
Cotton seed oil and soya bean oil compete for interchangeable uses in the edible field, and it would be unreasonable to expect the processors of syoa bean oil to lose position.

It appears at this stage that, with the Naval Stores factors in the tall oil industry, the prime effort will be in the direction of tall oil rosin production and that fractionation equipment will be installed to recover all of the tall oil rosin from the available crude tall oil.

The tall oil industry will have to give every consideration to finding a market for the tall oil fatty acids, especially in view of the low prices that are going to prevail on soya bean oil fatty acids.

To meet this adverse price situation, the tall oil industry will have to face several alternatives:

1. Obtain a lower price structure for crude tall oil.
2. Secure markets outside of the protective coatings field where it may not be subject to the same price competition as from soya oil.
3. Produce derivatives from the tall oil fatty acid fractions, which may then permit upgrading of the price structure.
4. Find more available markets for two of the fractions which constitute perhaps 25 per cent of the original crude feed, i.e., tall oil pitch and tall oil heads.
5. Raise the price of tall oil rosin more nearly to the wood rosin price, particularly where they may be interchangeable say for the production of rosin size. In this case, the paper industry would be paying a higher price in order to get some final benefits.



Number of sticks per cord from slide rule

D. S. DAVIS

Head, Department of Pulp and Paper Technology
University of Alabama

Slide rules can be used effectively for purposes for which they were never intended: determination of friction factors (1), viscosity-temperature relationship for water (2), conversion from Baume to specific gravity (3), and the humidity of air (4).

A further such application lies in the determination of the number of 4-ft. sticks of pulpwood per cord from the average diameter of the sticks. From any slide rule, remove the slide and insert it so that the numbering is upside down. Align 6° on the tangent scale with 112 on the A-scale (near the center). Then consider degrees on the tangent scale to be average diameters of the sticks in inches. Opposite, on the A-scale, read the number of 4-ft sticks per cord.

For diameters of 8 to 13 in., values so read agree with published data (5) within an average deviation of 1.2 per cent.

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(1) Davis, D. S., Chem. Met. Eng., 51 (7) 115 (1944).
(2) Davis, D. S., Chem. Eng., 58 (7) 142 (1951).
(3) Davis, D. S., Chem. Eng., 59 (3) 171 (1952).
(4) Davis, D. S. Chem. Eng., 59 (12) 205 (1952).
(5) Pulp and Paper Mill Catalog, p. 412, Fritz Publications Inc., Chicago, 1953-4.

Depreciation reform

(Continued from page 702)

made up by doubling the depreciation allowance, since an expenditure of $200 for new property would generate $52 of new tax revenue. Thus, if the entire $200 were spent for new equipment, there would be no tax loss to the Treasury whatever.

At present, the gross deficiency of present depreciation allowances, based on original cost, compared with current values, is calculated at between $5 and $6 billion a year. This is about one-third of the amount now allowed.

None of the depreciation reform proposals, formally presented so far, would produce increases in depreciation allowances of more than 20 per cent from present levels. On this 20 per cent basis, $120 would be spent, instead of $100 to which the Treasury is committed under present tax laws. This $120 spending would generate tax revenue of $31.20 ($26 for $100). The Treasury would forego tax income equal to 52 per cent on $20, or $10.40. In subsequent years, the Treasury would gain more as the amount to be depreciated would be reduced by the additional allowance.

Adhesives

(Continued from page 706)

many of the other resins already discussed.

The coumarone-indene and hydrocarbon resins are available as by-products from the coke and petroleum industries. They have a wide range of softening points and are normally dark in color. They are soluble in a variety of solvents and are also compatible with certain oils. They demonstrate good compatibility with styrene, acrylate, phenol-formaldehyde and some urea-formaldehyde resins. They are also compatible with a variety of rubbers and their use with elastomeric materials is well established.

The binders for mastic floor tile are frequently based on hydrocarbon resins.

Hydrocarbon waxes are also useful as adhesives in the packaging industry. Paraffin is, of course, derived from the petroleum industry and is available over a range of melting points and a variety of colors, depending on the degree of refinement. Wax is widely used for coating papers and two types are available. One is known as paraffin wax and the other as amorphous or microcrystalline wax. Both of these are composed completely of hydrocarbons but those in paraffin have a lower molecular weight.

The chief use of waxes as adhesives is for laminating papers such as two layers of glassine, which are used as inner liners in food packaging. Although waxes do not have high adhesive strength and tend to be brittle, they have excellent moisture vapor and water resistance.

The brittleness of the waxes can be overcome to some extent by the addition of polyethylene or polyisobutylene.

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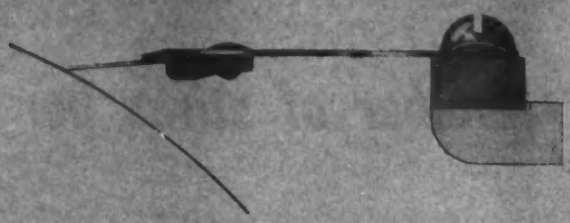
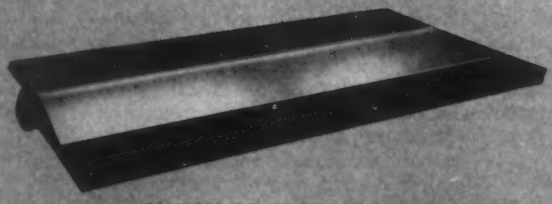
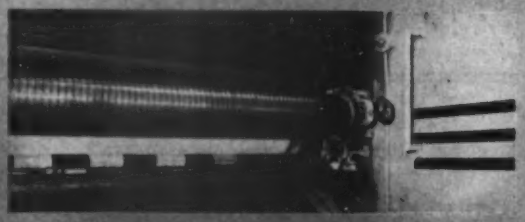


VICKERY HI-FLEX DOCTORS



VICKERY RS TYPE DOCTORS



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CURRENT COMMENTS

Newsprint industry catching up — U.S. urged to change attitude

The newsprint industry, which has been the slowest element of the industry to recover from the adverse markets of a couple of years ago, is rapidly catching up with an admitted surplus of manufacturing capacity.

WARREN B. BULLOCK

New records of production and consumption of newsprint were set in the closing months of 1959, with sufficient upsurge to bring the total output up to a figure only slightly lower than the record set in 1956. A recomputation of calculations by industry forecasters indicates that 1959 consumption will be 150,000 tons more than the 7,000,000 tons estimated at the beginning of the year. This would be an increase of 7.5 per cent over 1958 usage, and if the prevailing rate of demand persists, the current requirements of 8,500,000 tons will rise to a parity with the present capacity of 9,900,000 tons by 1963. Less optimistic experts figure that it will take a year longer to catch up with present capacity. Under these conditions, there is no anticipation of material increase in production facilities for some time to come.

For the first time in many years, 1959 and 1960 are the first in which no new newsprint machines will have been built. As it takes from two to three years to get a newsprint machine and auxiliary equipment financed and built, the surplus of capacity over consumption will continue to diminish for at least two years. The operating ratio in 1960 is now expected to be 87 per cent of capacity as compared with 85 per cent in 1959. On the Canadian side of the picture the difference between the Canadian and the United States dollar is costly to the Canadian mills. The exchange loss to Canada in the first nine months of the year averaged 4 per cent, meaning a cost of $7.69 per ton on exported paper. This is no small factor in the increasing usage of domestic mills like those operating in the South with southern pine as the raw material.

New type of textile

Another company has entered the new field of combining pulp and chemical fibers for the textile field. David L. Coffin, seventh of his family to head the 192-year-old C. H. Dexter & Sons Inc. of Windsor Locks, Conn., held a press conference in New York to report the success of the company's use of papermaking technique to produce a new type of textile. The new product, to be called Dextex, is a dacron-based interlining developed for wash-and-wear fabric. The new material will be produced as a continuous sheet of fibers fed to a wire mesh.

According to Mr. Coffin, the new product can not be classified either as woven or non-woven, and a new generic name will have to be chosen. This development is along similar lines to the project under which Kimberly-Clark and J. P. Stevens & Co., are combining paper and textile skills to produce a product called Kaycel which is described as a non-woven fabric. It is such materials which are under study for use in disposable paper clothing, and research is thus developing a rapidly broadening field for industrial advancement.

Vegetable parchment finds new uses

An older field now being exploited in new directions is that of vegetable parchment, a basic waterleaf paper sheet converted into an imitation of sheepskin by treatment with weak acids. Once chiefly used for food wrapping, a quarter of the output of the industry has now found other uses, such as master sheets for office reproduction machines, wrappers for electrical wires and the like. The increasing demand for such material is indicated by a sales record of $20,000,000 in 1958 as compared with $19,000,000 two years earlier, and an increased output from 51,000,000 lbs in 1952 to 65,000,000 lb. in 1958.

EFTA formally organized

Following in the footsteps of the European Economic Community, the "Outer Seven" nations of Europe not included within the Community have formally organized the European Free Trade Association. At the same time, the new organization for the mutual elimination of tariffs took preliminary steps to seek agreement with the older customs union. Meanwhile the executive chief of the Organization for European Economic Cooperation, Rene Sergent, told the National Foreign Trade Association of the United States at its annual convention in New York that the U. S. was growing more sceptical as to the advantages to us of the common market activties in Europe. With six nations in the European Community and seven in the "Outer Seven", the organization of which Mr. Sergent is the executive, applies to seventeen European nations including the countries which are not members of either of the new customs unions. He urged that this country change its present negative attitude toward the European groups. One bright spot is the decision of the six-nation European Community to extend its liberalization of import quotas to the U. S. and other western nations.

Financial report

Paper mill securities, as the year neared its end, showed marked swings as compared with the early November and October, with some issues evidently feeling the effect of the general slackening of business due to the steel strike. Others owing to special considerations in their special fields, showed a sharp rise over the prices of a month ago. All in all, however, the prices in early December were al-

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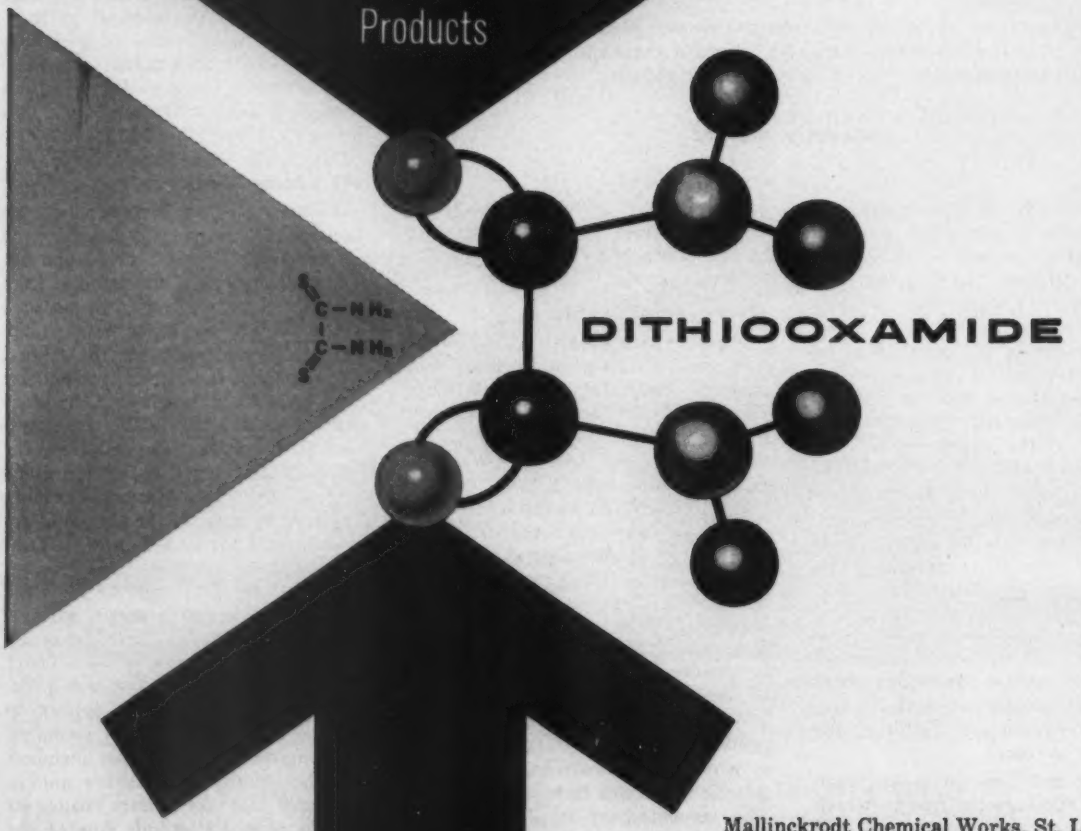

DITHIOOXAMIDE

Mallinckrodt Chemical Works, St. Louis, Missouri, recently announced this new building block...a chemical that can go in many directions to create new and better products. For example, the manufacturer suggests applications for dithiooxamide and its derivatives in the fields of metal sequestrants, pigments, organic intermediates and plant growth regulators.

A new building block with many potentials ...and as with so many such chemicals, Sulphur is a key ingredient!

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Current Comments . . .

most universally well above the quotations of a year ago, indicating the extent to which the industry has regained its former prosperity after the 1956-57 slump.

Crown Zellerbach Corp. — Net income for nine months ended September 30, $28,966,000; a year ago, $23,440,000.

Kimberly-Clark Corp. — Net income for six months ended October 31, $13,583,458; a year ago, $13,219,902.

Rayonier Inc. — Net income for nine months ended September 30, $9,594,506; a year ago, $1,729,344.

St. Regis Paper Co. — Net income for the first nine months of 1959, $19,772,687; a year ago, $13,195,053.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Dec. 10, 1959	Nov. 10, 1959
American Can	42¾	43⅞
Same Pref.	36½	36⅞
Celotex	33¼	34¼
Same Pref.	18½	* 18-18½
Certain-Teed	13	13⅛
Champion P & F	44	43
Same Pref.	90¼	88⅜
Chesapeake of Va.	42	* 38⅝-41⅛
Container	28½	29⅞
Same Pref.	82	* 82-85½
Continental Can	47	48¾
Same Pref.	77	78⅝
Crown Zellerbach	56½	56⅜
Same Pref.	87½	88¾
Diamond National	37¼	32¼
Same Pref.	* 29-29⅜	28¾
Federal Paperboard	44½	49
Same Pref.	21½	* 21¾-22
Fibre Paperboard	47¾	52½
Great Northern	50¼	52½
Hammermill	31½	32¼
International	135½	128½
Same Pref.	* 86½-87½	* 88½-89
Kimberly-Clark	71	65
McAndrews & Forbes	30¾	31½
Masonite	36	34⅛
Mead Corp.	47¾	45⅜
Same Pref.	* 86½-87½	* 87½-88½
Minnesota & Ont.	33⅜	33
Oxford Paper	31¾	33
Same Pref.	86½	93
Rayonier	25½	24½
Riegel	43	39¾
St. Regis	53¾	52⅜
Same Pref.	* 91⅛-94½	* 91-97
Scott	79¼	81¼
Same $4 Pref.	* 84-86	* 87½-89½
Same $3.40 Pref.	* 74¾-75½	* 76-79½
Sealright	41¼	36⅛
Standard Packaging	36¼	33¼
Same $1.60 Pref.	*106-112	* 95-105
Same $1.20 Pref.	41¼	36¼
Sutherland Paper	33½	36¾
Union Bag-Camp	44	45
Union B & C	26⅜	33½
U. S. Gypsum	94	97½
Same Pref.	*151-153	*145½-155
West Va. P&P	56½	48¼
Same Pref.	* 93⅞-95¼	* 96½-99

New York Stock Exchange — Bonds

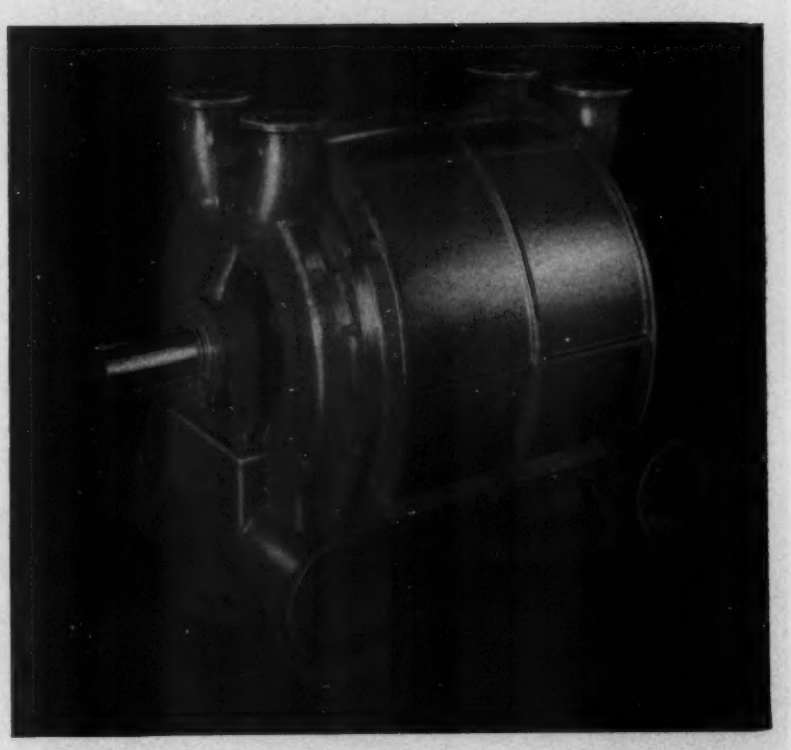
Champion P & F 4½%	111¾	110
Champion P & F 3¾%	82	—
Diamond Gardner 4%	89½	—
Kimberly-Clark 3%	88½	86½
Oxford 4¾%	111	108
Scott 3%	104¾	104

American Stock Exchange — Stocks

American Writing	32	30½
Allied Paper	14½	11¾
Brown Co.	11½	12⅜
Puget Sound P & T	25⅜	24⅛

*Closing Bid and Asked Prices

This New Nash Vacuum Pump Offers Four Separate Suctions and Vacuums Simultaneously



The Nash 5308-A has four separate suction inlets, each of which functions independently of the others. This offers the machine operator great flexibility, since these may be used in any desired combination to produce a variety of capacities and vacuums.

Picture below shows simple drive possible and flexibility of piping permitting capacities to exactly fit requirements of different sections of the paper machine.

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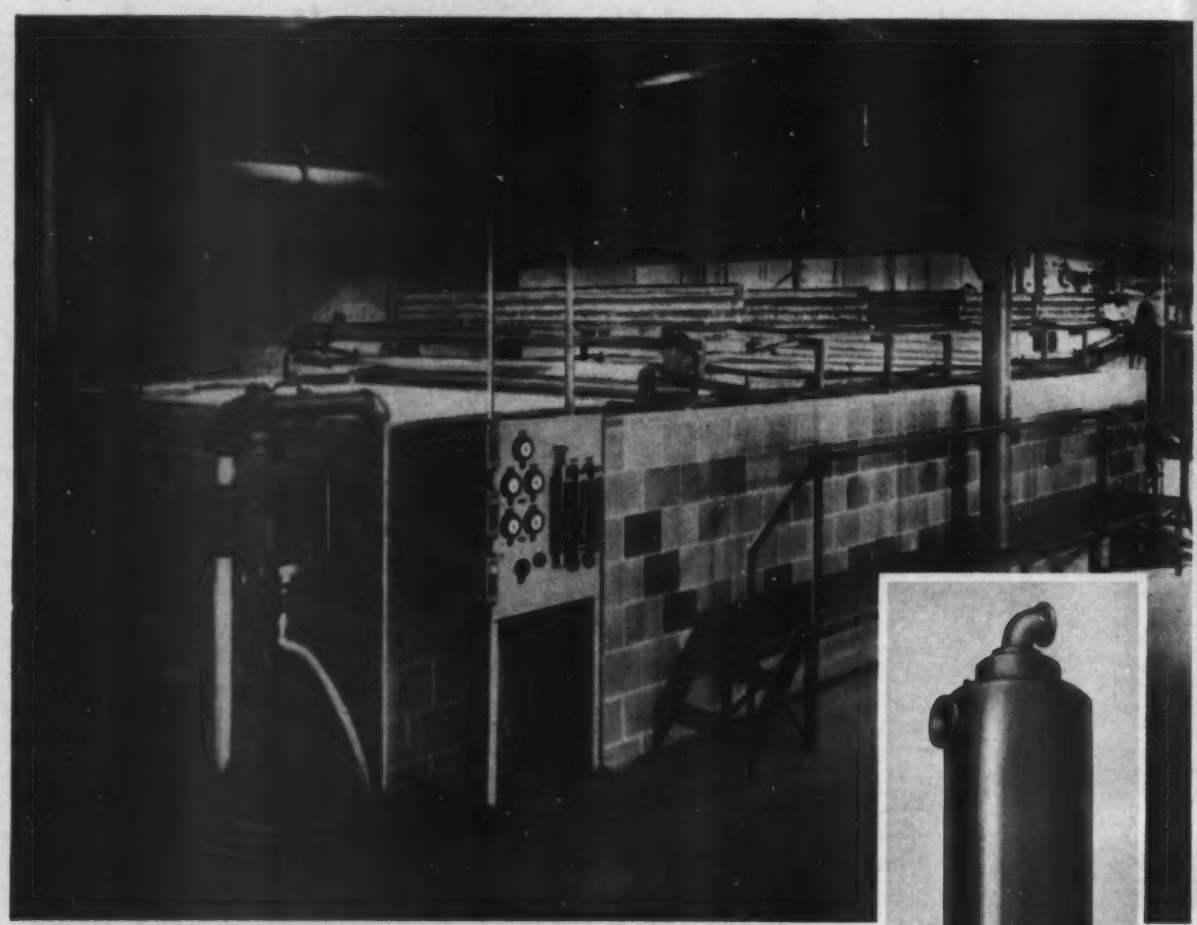

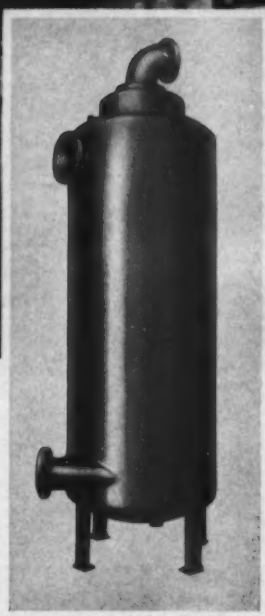

"Aqua-Air-Spray"* Aeration Tank is automatic, simple, maintenance free. Drives more air into solution under pressure. Air-saturated white water is then released and distributed through either horizontal or vertical type Double Disk Inlet Valve*.

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Long recognized as the world's finest flotation saveall unit, Sveen-Pedersen now increases its lead even further. Through a field-proven, revolutionary "Aqua-Air-Spray"* system, more than twice as much air as previously possible is *dissolved* into the white water. Millions of tiny air bubbles are made available to float the fiber and filler out of the solution.

As a result, S-P Saveall — now made by Jones — offers these important advantages: Greater fiber and filler recovery — faster and in higher concentration • Better water clarification • Reduces — or even eliminates — flocculent chemical dosage • Requires up to 20% less pump horsepower • Minimizes maintenance.

For full details on the reclaiming of expensive fibers and fillers, and effective solutions to stream pollution problems, write to E. D. Jones Corporation, Pittsfield, Mass. Ask for bulletin F-10.

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NEWS of the INDUSTRY

Scapa Dryers Wins Lawsuit

The U.S. Supreme Court has just written the end to the long drawn-out dispute between Abney Mills and Scapa Dryers Inc., in Scapa's favor.

Abney Mills, owner of the Brandon Dryer Felt Mill (which was formerly operated by Brandon Corp.), claimed that in 1959 Brandon Corp. had acquired from Hindle, Son & Co. Ltd. of Blackburn, England, perpetual exclusive rights to the use and operation of Hindle dryer felt looms within the United States and that Abney's rights were violated when Scapa Dryers Inc., which is affiliated with Hindle, Son & Co. Ltd., undertook to manufacture dryer felts woven on Hindle looms.

Abney won in the U.S. District Court and secured a permanent injunction against the use and operation of Hindle looms within the U.S. by the Hindle-Scapa interests. Then the U.S. Court of Appeals unanimously reversed the judgement and directed the dismissal of Abney's complaint, because the court evidence established that the parties to the 1939 agreement never intended the exclusive rights to be perpetual but to run only during the life of certain U. S. patents covering the looms and purchased by Brandon Corp. in 1939, all of which had expired years before the establishment of the Waycross plant.

As a result of the action taken by the U.S. Supreme Court, the judgment dismissing Abney's suit has become final and is not subject to any further review.

Recent Market Studies on Pulp, Paper and Board

Government and government-sponsored organizations have recently prepared three long-term market outlook studies on pulp, paper, paperboard and related products.

A new study on "Meeting Future Needs" has been prepared under the auspices of the Food & Agriculture Organization of the United Nations. This report deals with the supply-demand prospects for paper and allied products in future years and estimates world demand for paper and board at 148 million short tons in 1975.

Another study, "The Economic Situation in the Pulp and Paper Sector in Europe", has been approved for publication by the Organization for European Economic Cooperation. This study includes an analysis of paper and board demand through the year 1965 for the Western European countries. The OEEC utilized in its report, the projection techniques developed in the U. S. Department of Commerce study prepared in 1957 on United States "Pulp, Paper, and Board Supply-Demand".

The "Supply-Demand" report, prepared by the Forest Products Division, Business & Defense Services Administration, was the first study ever prepared by the U. S. Department of Commerce for public use which analyzed projected future supply and demand in terms of principal products for one of the Nation's major manufacturing industries.

The 1957 and 1958 issues of "Pulp, Paper and Board Supply-Demand" report are available from the Superintendent of Documents, U.S. Government printing Office, Washington 25, D.C. Price: 1957 issue, 60 cents; 1958 issue, 20 cents. The 1959 supplement is available from the Subcommittee on Commerce and Finance, Committee on Interstate & Foreign Commerce, House of Representatives, Washington 25, D.C.

Round Table Discussion at Albany Felt

Felt's vital role in paperboard manufacturing was the subject recently discussed during a superintendents' Round Table held at Albany Felt Co.'s main plant in Albany, N. Y.

Fourteen superintendents attended the two-day work session to cover subjects such as felt conditioning, washing, felt design, finish requirements and fiber shedding.

Research Laboratory Ready to Serve

A new independent research laboratory known as Fiber Research has begun operation at 3104 Western Ave., Seattle, Wash. The center is represented by the combined efforts of the pulp and paper division of Hill & Ingman and Washington Iron Works.

Edgar G. Putnam, technical director of the center stated: "The function of the staff and facilities of Fiber Research will be to Collaborate with scientific personnel throughout the pulp, paper and board industries; and to make available to the industry, an independent development, research and testing laboratory."

Both batch and continuous pulping facilities for the production of chemical, semi-chemical or mechanical pulp as well as TAPPI test equipment for full pulp evaluation are used at the center.

Milprint Films the Reasons Behind Laminated Packaging

Milprint Inc. has just completed a movie on the vitally important and highly complex subject of film and foil laminations and polyethylene extrusions.

In this 17-min., color movie, interested parties will view the simple, yet thorough and palatable explanation of the most modern trends in laminated packaging. The film will show the purpose behind different laminations and will view the precision workings of a lamination and a poly- extruding machine in action, along with revealing solutions to specific packaging problems.

Oscar Kress Foundation Established at Institute of Paper Chemistry

A bequest of $100 thousand has been received by the Institute of Paper Chemistry from the estate of Marion Bessie Kress for the establishment of the Oscar Kress Foundation to furnish an income for scholarship grants.

Mrs. Kress provided the endowment in memory of her late husband who was the brother of Dr. Otto Kress, technical director of the Institute from 1929 until his retirement in 1948.

Dr. Kress, now a resident of Naples, Fla., was the first scientific staff member of the Institute and contributed in numerous ways to its growth as a graduate school and research center.

Recent Expansions in the Industry

Two Black-Clawson Newsprint Machines for Russia

Black-Clawson Co. will deliver two high-speed newsprint machines to Russia in 1962 and 1963 under a contract recently closed between Parsons & Whittemore/Lyddon Organization and Techmashimport, Moscow.

Soviet economic planners studied the internationally machinery building industry for many months before making their choice for the Black-Clawson units.

The machines and auxiliary equipment will be manufactured substantially and the foundry and machine works of Black-Clawson International in Newport, England. The two itentical machines will be the largest in Russia. They are each, 284 in. wide and will be designed mechanically for speeds up to 3000 fpm. They will operate initially in the 2000 to 2500 fpm range, producing 330 metric tons per day of standard newsprint, trimming 265 in. The value of this order exceeds $12,000,000.

CZ to Step Up Production at Port Angeles

The Port Angeles, Wash., mill of Crown Zellerbach Corp. is planning to step up its production of paper for telephone directories.

Because of the expansion of telephone use and the growth in phone directories, Reed O. Hunt, CZ's president, stated that a change is under study for the mill to shift the No. 1 paper machine from the production of newsprint to the manufacture of paper for telephone directories.

The Port Angeles mill is one of the major suppliers for a number of Colorado customers, but with increasing freight costs, CZ is studying the possibility of building a newsprint mill in Denver.

Hills-McCanna Opens Five New Offices

Hills-McCanna has announced the opening of five new offices which will represent the company's full line of products. They are as follows:

H. B. Ford will direct the office located at 1231 Oakwood St., Birmingham 15, Ala.

W. I. Brittain will direct the office located at 105 Fontenot Bldg., 633 Oak Villa Boulevard, Baton Rouge, La.

D. M. Rose will direct the office located at 145 University Ave., Rochester 5, N. Y.

C. T. Williams will direct the office located at 4007 Belleaire Boulevard, Houston 25, Texas.

A relocation of the company's San Francisco district office to 211 Joaquin Ave., San Leandro, Calif., has been announced. This office will be under the direction of E. H. Lunder.

Southern Land to Spend $40 Million on New Plant

Southern Land, Timber & Pulp Corp. will spend $40 million in building a pulp and paper mill in Southwest Georgia. The exact location has not been announced.

Planning and supervision of the new mill will be done by the newly appointed executive vice president, Edward L. Cowan of Calhoun, Tenn.

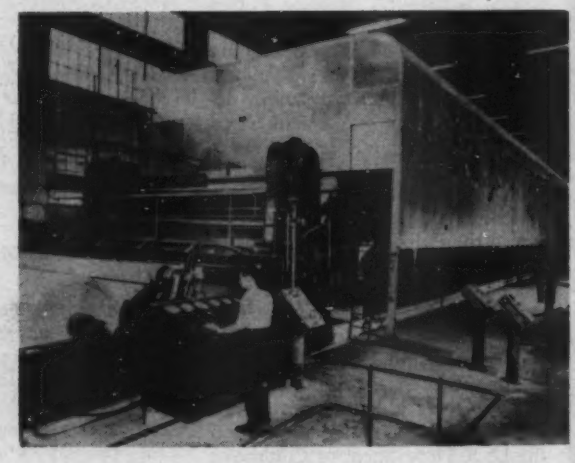
John J. Neely, Southern's president, said the mill would have an initial capacity of 400 tons of finished paper products a day and would use about 800 cords of wood daily. There will be 450 persons employed at the mill and another 400 workers in woods crews on the producing timberlands.

Allied to Get New Coating Machine

A unique paper coating machine, designed by John B. Kohler of Woodstock, Ill., has been built by Canton Tool Mfg. Co. for Allied Paper Corp. of Kalamazoo, Mich.

Allied will use the machine to apply the smooth, glossy coating on such papers as magazine covers, calenders and advertising brochures.

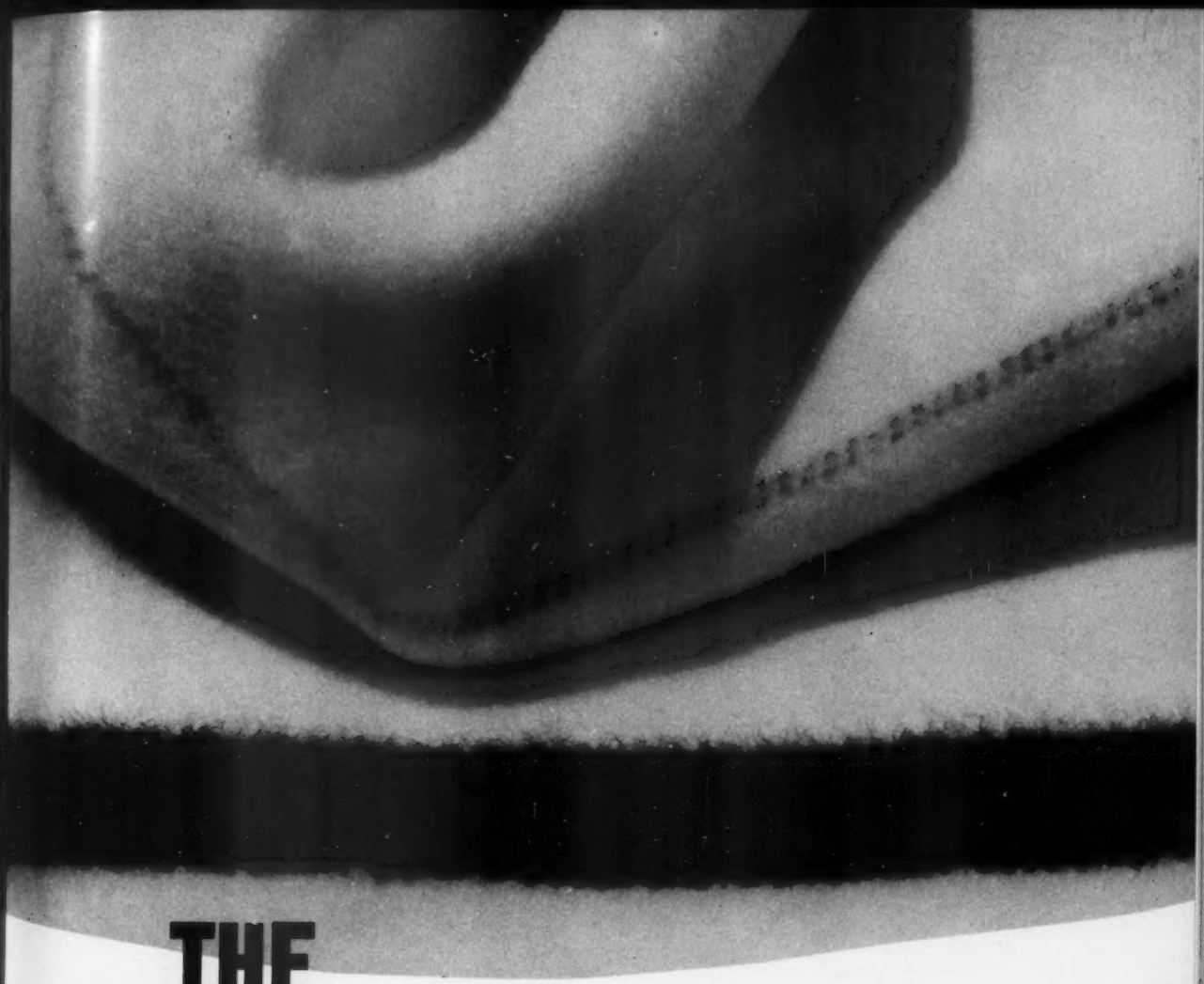
The machine will coat paper up to 80 in. wide. The specially designed coater pumps coating through an applicator tube against the bottom of the paper. Coating is measured and smoothed by a



Townsend Hook Installs New Machine

The Snodland mill of C. Townsend Hook & Co. Ltd. located in Kent, England, recently started up a new Black-Clawson paper machine designed to make magazine printing papers. A stock preparation system was also among the new equipment added.

The paper machine and the stock preparation system were supplied by Black-Clawson International Ltd. of London, which also engineered the flow of the new system and its instrumentation. Producing a sheet of 168-in. trim, the machine is of Hydroflyte design. The headbox delivers stock through the cantilever fourdrinier which carries a wire approximately 185 in. wide by 90 ft. long.



THE MARK OF THE BEST IN FELTS

The blue and red stripes on this Super Plate Press Felt have identified all Huyck felts for close to 90 years.

No other feltmaker has come forward with so many "firsts" in felt-making and felt services as Huyck. No other felt has ever offered more advantages and economies.

Look for these familiar blue and red stripes on your felts and felt packages—THE MARK OF THE BEST IN FELTS *for your machines.*

HUYCK FELTS

Huyck Felt Co.,
Rensselaer, N. Y.;
Aliceville, Ala.;
Division of F. C. Huyck & Sons.
In Canada: Kenwood Mills Ltd.,
Arnprior, Ontario

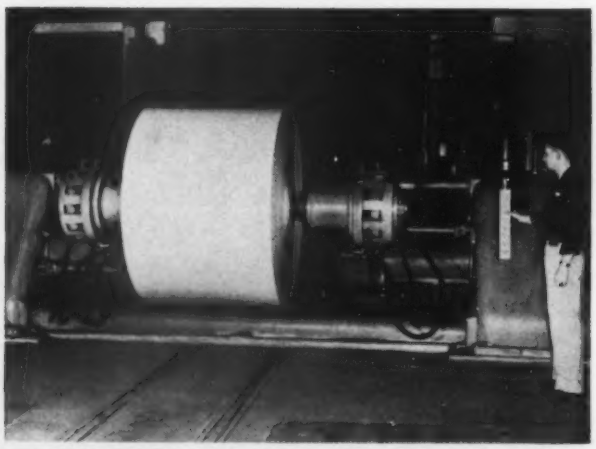
NEW HUYCK FELTS ★ INDUSTRIAL FABRICS

FIRST IN QUALITY • FIRST IN SERVICE SINCE 1870

Ready for the roll. Notice the absence of a shaft. Roll is moved in between lifting arms which close under pressure and elevate to desired height.

LANGSTON SHAFTLESS UNWIND STAND

Boost your production . . . reduce your slitting and rewinding costs



Easy, fast, completely safe. One man does everything. Operating push-button controls, he closes lifting arms, elevates roll, sets brakes.

One man can load the heaviest roll. No heavy shaft to handle. No cone tightening. No couplings to engage. No crane lifting. Just pushbuttons. This is the Langston heavy duty shaftless unwind stand for rewinding and converting applications.

You not only save time, you also get better unwinding. Roll can be positioned laterally by push-button control—even when the machine is running. It's held firmly under pressure for complete safety throughout the unwind. Several braking arrangements can be provided to handle a wide range of grades and conditions. Available extras provide for handling very narrow rolls; for constant tensioning; for automatic braking of idler rolls; for automatic web alignment and side register control; for web oscillation; and for local or remote control.

This new Langston shaftless unwind stand can be used with any make of slitter. Available for maximum roll widths from 40 to 132 in. and diameters from 14 to 84 in. Speeds to 3000 fpm and higher. For complete information, write Samuel M. Langston Co., Camden 4, N. J.

SHEAR CUT CLEAR CUT

LANGSTON Leadership by design

For more data circle 117 on Post Card

polished knife as it is applied. The action of the knife is controlled by a jet of air blowing against the back of the sheet of paper. The result is claimed to be smoother and more uniform than other methods.

Penick & Ford Expands In Iowa

A new starch derivative producing plant has been built by Penick & Ford Ltd. Inc. at its corn refining facility in Cedar Rapids, Iowa.

The plant was specially designed to produce the company's expanding line of specialty starches including its Penford gums.

One of the main features at the new plant is a huge dry blender which is said to be the world's largest. The big advantage of mixing starches in a blender of this size is not the amount of the batch, but the extreme uniformity it allows.

Another part of the expansion program included a new laboratory building where research activities can be stepped up. This building also houses a sales-service laboratory devoted to the special problems and needs of customers.

Beloit Iron to Expand in England

Paper machinery designed by Beloit Iron Works may soon be built in England.

Negotiations are in process with the Walmsley (Bury) Group Ltd., Lancashire, England, for an agreement of patent licensing and concurrently for the purchase of a minority interest in the English concern. The proposed transaction is one which would make available to each firm, the specialized knowledge of the other's patented equipment and techniques. Beloit machinery would then be available with U. K. financing facilities.

Oxford to Install New Precipitator

An electrostatic precipitator designed to recover more than 38,000 lb. of salt cake per day will soon be constructed at the Rumford, Me., plant of Oxford Paper Co.

The precipitator is engineered and fabricated at the Metal Products Division of Koppers Co. Inc. in Baltimore. It is of the double-chamber type and is designed to handle 115,000 cu. fpm of gas from a 300-ton recovery boiler.

Specifications for Oxford call for removal of 95 per cent of salt cake held in suspension in gas from the boiler. With salt cake rated at about $40 per ton, the precipitator performance thus can be translated into a saving per day of approximately $760.

Hooker Chemical Establishes New York Headquarters

The board of directors of Hooker Chemical Corp. has voted to establish corporate headquarters in New York City. Many corporate functions which can be performed more effectively at Niagara Falls will continue to be handled there entirely.

In addition to the corporate group, the New York district sales offices of Eastern Chemical, Durez Plastics and Phosphorous divisions will move to the new location from the Lincoln Bldg. at 60 East 42nd St. The new corporated headquarters will be at 666 Fifth Ave., New York City, about March 1.

Dobeckmun to Open New Addition

On November 1, Dobeckmun Co. will open a new addition to its Brookside plant in Cleveland. This

Every Mill Receiving Chips from the Woodlands Needs a Kewanee

DN-45 GRADE LEVEL TYPE KEWANEE HYDRAULIC TRUCK DUMPER UNLOADING CHIPS IN PROMINENT NORTH CAROLINA KRAFT PAPER & PULP MILL

Kewanees are available in scale or non-scale, pit or grade level types in a range of four sizes to suit individual needs. Scale type weighs in the load, dumps it and reweighs vehicle in less than three minutes' time. Sturdy, massive design, coupled with sound engineering features makes your investment in a Kewanee long and profitable. One man operation assures low operating cost. The heart of the Kewanee is its power system embodying the finest features, including a *high speed, high pressure, replaceable cartridge Vane Type* Pump which eliminates the need of being removed from its mounting should repairs be necessary. A Kewanee also assures safety in the handling of incoming chips.
Your Kewanee never becomes an orphan. Nationwide "Maintenance and Inspection Service" is immediately available through our field men.

Write today for Kewanee Specifications and Prices

Screw Conveyor Corporation
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WINONA, MISSISSIPPI • SANTA CLARA, CALIFORNIA
HAMMOND PRODUCT
TRADE MARK REG. U.S. PAT. OFFICE

Branch Offices
Hackensack, N. J. — Memphis, Tenn., — Dallas, Texas — Tampa, Florida

For more data circle 118 on Post Card

addition will house a finishing department for slitting, wrapping, packing and storage of packaging roll products. Before the addition, the company's Monroe Ave. plant was handling these operations.

Dobeckmun is a manufacturer of flexible packaging and metallic yarn. One of the newest type of packaging products now being turned out by the company is a pyramid-shaped container which is finding use for milk, ice cream and noncarborated soft drinks. The tradename given to this carton is "Tetra Pak".

New Division for CIBA

CIBA Co. Inc. has announced the establishment of a Pigments Division which will be located in the new building at Fair Lawn, N. J.

This division will handle a broad range of organic pigments, pigment dispersions and soluble dyes for use in the coatings, plastics and printing ink industries.

Waldorf to Begin Expansion

Waldorf Paper Products Co. of St. Paul will be undertaking a multi-million dollar expansion program at Missoula, Mont., in conjunction with Hoerner Boxes Inc.

The new facility will be operated by Waldorf-Hoerner Paper Products Co. — owned equally by the two container companies.

A 400 ton per day capacity is expected on the machine which will produce liner for corrugated boxes. The program will be completed in about a year.

Black-Clawson Begins Construction on Research Lab

The new research laboratory which Black-Clawson is now constructing in Middletown, Ohio, will be equipped to investigate every aspect of paper stock preparation and other paper-making operations.

Frank Peterson, president of Black-Clawson, stated that the relocation and expansion of the laboratory will keep pace with the growth of the company's line of equipment and the increasing demand of the paper industry for development of new and improved production machinery.

Rayonier to Install New Pulping Process

The Grays Harbor sulfite mill of Rayonier will be converted from ammonium-base to a newly patented sodium-base process. This conversion is estimated to cost $7,500,000, and is expected to begin operation in 1961.

Although other sodium-base sulfite processes have been developed in recent years, Rayonier is the first commercial installation in North America.

The key to the sodium-base process is its chemical and heat recovery features which will add economies to cellulose production, abatement of waste chemicals and a "high order" of production flexibility unequalled by other sulfite processes.

Olin Mathieson Opens New Plant

The Packaging Division of Olin Mathieson Chemical Corp. began operations on their new Dallas corrugated container sheet plant.

Opening of the new facility will provide Olin customers in the Dallas-Fort Worth area with rapid, on-time service. A wide range of containers will be produced. The plant will be supported by basic paperboard production from the Packaging Division's pulp and paper mill in West Monroe, La.

Containing approximately 45,000 sq. ft. of floor space, the plant will have a production capacity of 5,000,000 sq. ft. of corrugated containers per month. Stewart M. Norris will manage the new Dallas operation.

Continental to Double Corrugated Capacity

Continental Can Co. will double the capacity of its Los Angeles corrugated box plant next year when it completes the installation of equipment at a new location it has leased.

The new plant, having an area of 213,000 sq. ft., will be equipped with a Langston combiner which will produce a continuous sheet of corrugated paperboard 85 in. wide and at a rate of 10 million sq. ft. per week on a two-shift basis.

New Headquarters for Crown Zellerbach

Crown Zellerbach Corp. has announced the transfer of its headquarters offices from 343 Sansome St. to the new Crown Zellerbach building at One Bush St., San Francisco 19.

Conoflow Appoints Sales Agent

John M. Vossler & Co. of North Hollywood, Calif., has been appointed sales agent for Conoflow Corp. The Vossler firm will be exclusive representative for Conoflow in Southern California.

Mailing address for John M. Vossler & Co. is: 4914 Lankershim Blvd., North Hollywood, Calif.

Finishing Equipment at Wausau

Wausau Paper Mills Co. has recently installed several new pieces of converting and finishing equipment at its

Allied Paper Installs Size Press Upside-down

An unusual "inverted" horizontal size press has been installed on the No. 10 machine at Allied Paper Co. of Kalamazoo, Mich.

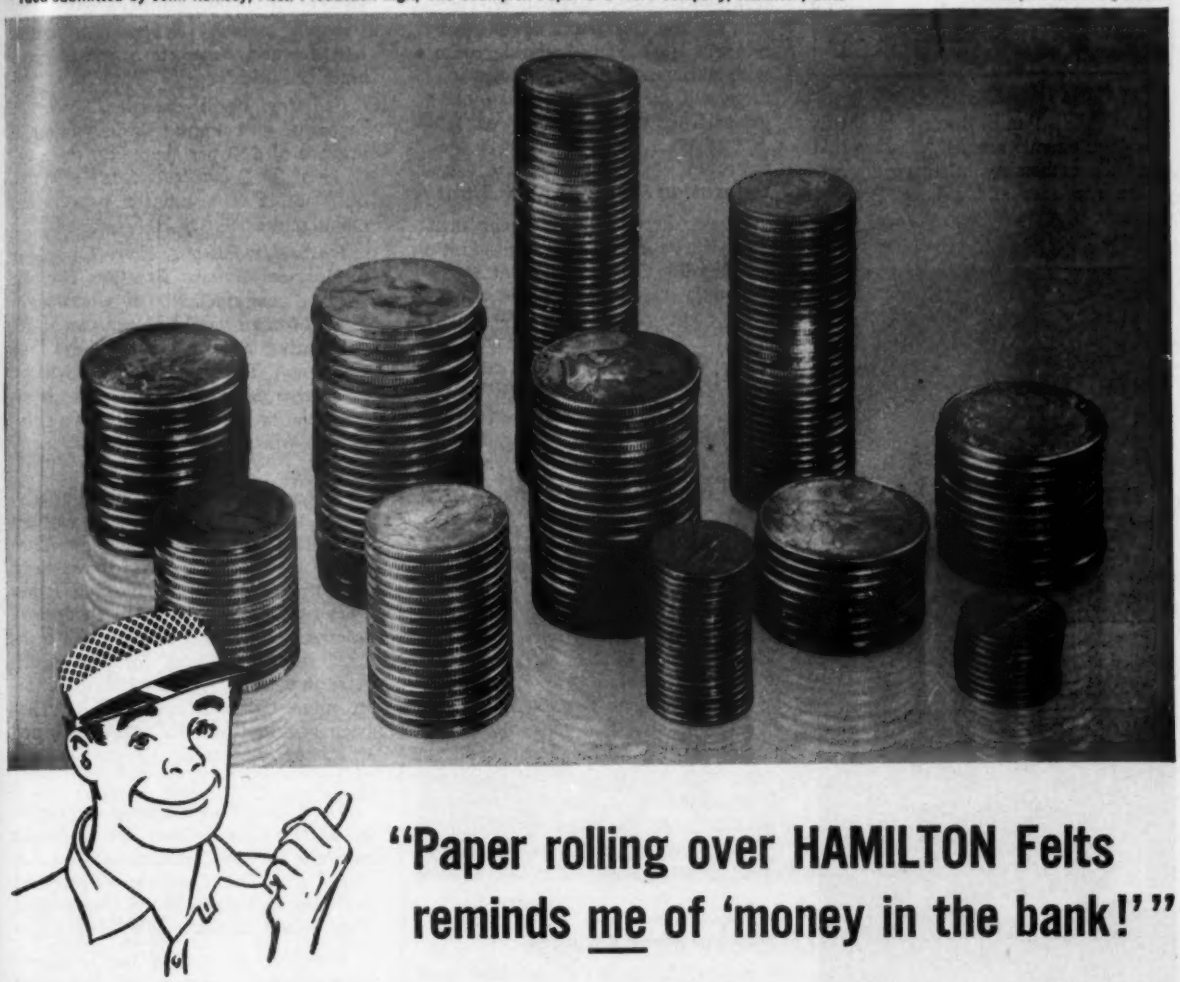
This unusual installation involved placing the size press frames upside-down, thus supporting the press in an unconventional "off-the-floor" fashion. It is said to be the first known "inverted" horizontal size press installed anywhere.

Dr. Ward Harrison, president of Allied Paper Corp., conceived this idea and the installation was designed and built by Patton Mfg. Co. of Springfield, Ohio. L. B. Owen, vice president of production at Allied, has indicated satisfaction with the first new "inverted" installation because, among other things, the design facilitates equally simple roll handling and allows for unexpected ease of threading and handling of broke.

A second order of identical design has just been placed with Patton for Allied's No. 11 machine. This is to be installed early this year.

• Idea submitted by John Ramsey, Asst. Production Mgr., The Champion Paper and Fibre Company, Hamilton, Ohio

Photo by: N. Armstrong Roberts



"Paper rolling over HAMILTON Felts reminds me of 'money in the bank!'"

YOU CAN'T BEAT

Hamilton

FELTS

*** WIN... *A NEW Spincast Fishing Outfit***

"What famous landmark reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. The best letter each month by a papermaker wins a new 1960 model Shakespeare Spincast Rod and Reel — FREE! Every papermaker entrant receives a famous Rex Spoon fishing lure — FREE. Send me your suggestion — today. Ham Feltz, 612 First National Bank Bldg., Cincinnati 2, Ohio."

"Every time I see paper
rolling over Hamilton Felts,"
writes John Ramsey, paper-
maker, of Hamilton, Ohio,
"it reminds me of money—
money being saved for the papermaker."

The long service
and high quality performance
you get from Hamilton Felts
means money in the bank.
Hamilton Felts help you beat
the high cost of downtime
by keeping your machines running
at top speed . . . longer . . .
turning out more tonnage
with less broke or imperfections.

Ask your Hamilton Felts Service Salesman
how long-lasting Hamilton Felts
can help you reduce
the high cost of downtime . . .
or write us—today.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

For more data circle 119 on Post Card

News of the Industry . . .

Brokaw, Wis., mill. Included in this new equipment are: B. F. Perkins hydraulic embossing calendar, an Appleton rewinder and a large Seybold trimmer.

B. F. Perkins hydraulic embossing calendar installed at Wausau.

Large 85-in. Seybold trimmer installed at Wausau.

The 60-in.-face embossing calendar is equipped to produce an endless variety of standard and fancy finishes. The rewinder, geared to run at 3,000 fpm, will enable Wausau to furnish printers and convertors operating web presses. The 85-in. Seybold trimmer, with automatic and semi-automatic features, will permit faster and more accurate trims on all cut-size papers.

Operation Starts at New Plant

St. Joe Paper Co. has begun operations of its newly acquired plant in Sharonville, Ohio. The plant was acquired last spring and includes more than 105,000 sq. ft. of production area.

The main piece of equipment in the plant is a 74-in. corrugated doublebacker which combines kraft linerboard with the fluted corrugating medium. A million sq. ft. of containerboard per week is expected.

Research Building for Champion

Approximately $175,000 will be spent in construction for a new research building to be built for Champion Paper & Fibre Co. of Hamilton, Ohio.

If other plans materialize, Champion will use this building as the first unit of a research center on the same site which would include two more research buildings matching it in size and layout—and possibly a pilot plant for experimental paper-making machinery.

Management Changes

Taylor, Stiles & Co. has been sold to R. H. Solem, president of *Wisconsin Knife Co.* and will be operated by him as an affiliate of Wisconsin Knife Co.

International Paper Co. and *Stanley Works* of New Britain, Conn., have formed a jointly owned company—*International-Stanley Corp.* The new company will sell the paperboard freight car doors reinforced with steel strapping which the two companies had formerly manufactured as separate activities.

St. Regis will exchange 267,325 shares of its common stock, valued at upward of $50 per share, for the purchase of the *Schmidt & Ault Paper Co.* of York, Pa., a pioneer paperboard manufacturer.

Champion Paper & Fibre Co. plans to acquire *Montag Brothers Inc.* of Atlanta, manufacturers of school supplies. Montag would become an independently managed subsidiary of Champion. The principal effect will be to further strengthen the close business relationship between the two companies which has existed for many years.

By an exchange of stock, Kimberly-Clark is crystalizing some of its foreign enterprises. Minority interests in *Kimberly-Clark,* South Africa have been sold to *South African Pulp & Paper Industries Ltd.* from whom a minority interest will be secured in a plant making creped wadding for the South African market. An outstanding minority interest in a Mexican affiliate has been acquired and the name changed to *Kimberly-Clark de Mexico, S. A. de C. V.*

The transaction has been completed by *Davey Co.* of New Jersey in the purchase of the *Constantine Board & Paper Co.* The Constantine property will now be known as the *Constantine Paperboard Division of Davey Co.*

The Norfolk mill of the *St. Lawrence Paper Co.,* which was shut down November 14, has been sold by the *Knight Newspaper Syndicate* of Akron, Ohio, to the Aco Machinery Corp. of Watertown, N.Y. No comment has been made on what will be done with the 58-year-old paper-making operation.

Sealright-Oswego Falls Corp. of Fulton, N.Y., and the *Nashua Corp.*

Chemi-groundwood Pulp Mill in Europe

A chemi-groundwood plant, designed to produce 100 tons of hardwood pulp a day, has been built in France for the Societe F. Beghin, S. A., at Corbehem, France, in the Pas de Calais area by Stone & Webster Engineering group.

The new mill represents a pioneering contribution to the European pulp and paper industry because it provides an answer to the problem of utilizing economically the hardwood trees from forests having an abundance of this raw material.

All functions of this plant are controlled from one graphic panel; chemicals are proportioned by preset flow controllers; rate of heating and cooking time is controlled by timers. Process valves are electrically operated and illuminated colored lines on the graphic panel indicate the corresponding pipelines then in use.

Coming Events

PIMA

January 21 — Michigan Division (Joint meeting with Kalamazoo Valley section), Hotel Harris, Kalamazoo, Mich.
January 21 — Northwestern Division, St. Cloud Hotel, St. Cloud, Minn.
February 18 — Michigan Division, Hotel Harris, Kalamazoo, Mich.
April 23 — Michigan Division, Hotel Harris, Kalamazoo, Mich.

TAPPI

February 22-25 — 45th Annual Meeting, Hotel Commodore, New York, N.Y.
May 23-25 — 11th Annual Coating Conference, Edgewater Beach Hotel, Chicago, Ill.
June 14-16 — Pulp Bleaching Conference, Edgewater Beach Hotel, Chicago, Ill.
May 13-14 — Pennsylvania-New Jersey-Delaware Division, Hotel Du Pont, Wilmington, Dela.
June 7-9 — National Meeting, St. Francis Hotel, San Francisco, Calif.

OTHER MEETINGS

January 19 — Salesmen's Association, Eastern, Luncheon Meeting, Belmont Plaza, New York.
January 21 — Fourth Annual Pulp and Paper Conference, Western Michigan University.
January 25 — National Association of Waste Material Dealers, Pacific Coast Division, Leopard Cafe, San Francisco, Calif.
January 25-28 — Plant Maintenance & Engineering Show, Convention Hall, Philadelphia, Penn.
January 26-29 — Annual Meeting, Technical Section CPPA, Queen Elizabeth, Montreal.
February 1-4 — Instrument Society of America Conference, Rice Hotel, Houston, Texas.
February 15-17 — 1960 Forest Management Control Conference, Purdue Memorial Center, West Lafayette, Ind.
February 22-25 — 83rd APPA Annual Meeting, Waldorf-Astoria, New York.
February 22-25 — American Pulpwood Association, Annual Meeting, Roosevelt Hotel, New York.
February 23 — Salesmen's Association, National Meeting — 41st Anniversary Luncheon, Waldorf-Astoria, New York.
March 12-15 — 47th Annual Convention, National Association of Waste Material Dealers, Waldorf-Astoria Hotel, New York.
March 22-23 — Folding Paper Box Association of America, Annual Meeting, Ambassador Hotel, Los Angeles.
March 27-30 — National Paper Trade Association, Paper Show and Annual Convention, Waldorf-Astoria, New York.

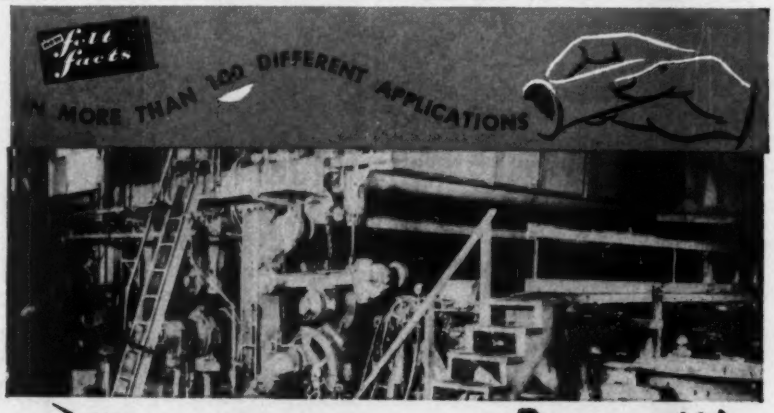
of Nashua, N.H., have announced that Sealright has purchased Nashua's interest in *Canadian Sealright Co. Ltd.* of Peterborough, Ontario, Canada.

New Products

Mead Packaging Inc. has developed a new concept in folding boxes. The new-type box is designed to eliminate crushing of merchandise in top-to-bottom stacking, stand fully open for loading and reduce shipping costs. Unusual strength is attained through a special flip-type, double-wall post in the four corners of the bottom. This is all achieved through one piece construction. Mead has named this new product Stack-Pak.

Another packaging product called Zip-Pak is being marketed by *Henry B. Katz Industries Inc.* of Newark, N. J. This is a new cushioned shipping and mailing bag with an instant self-seal closure and a built-in zip-cord opener made from single-faced corrugated. The manufacturer claims that the product is over 50 per cent lighter than heavy macerated-filled bags.

A special lightweight paper for offset duplicating (half the weight of standard offset duplicating papers) has been added to *Ecusta's* Waylite line. In addition, the company has also announced the development of a 17-¼-lb. Waylite paper for letterpress printing.



U-31 Treatment *Pays off!*

Another Albany Felt Company *specific-purpose treatment*, U-31, receives the Endorsement of Tissue Manufacturers *everywhere.*

The payoff of "yesterday's" research is now being measured by today's increased tissue production.

After months of extensive testing the U-31 Treatment, specifically developed for Pickup and Wet Felts for Yankee Fourdrinier Machines, has proven itself.

The proof: actual performance testing on over 100 different positions throughout the country.

Specifically, *U-31 provides quicker startups.* Even more important, *U-31 provides higher daily production.* Why? Because U-31 gives the felt wetting-up characteristics never before obtained and also permits greater water removal at higher speeds.

Ask your Albany Felt Sales Engineer about the advantages of U-31 chemical treatment. There may be an application for it in your mill.

Engineering Service
Laboratory Service
Research Service
} *Available to You Without Cost!*

Talk it over with your Albany Felt Sales Engineer

AF

ALBANY FELT COMPANY
ALBANY, N. Y.
World's Largest Manufacturer of Paper Machine Felts

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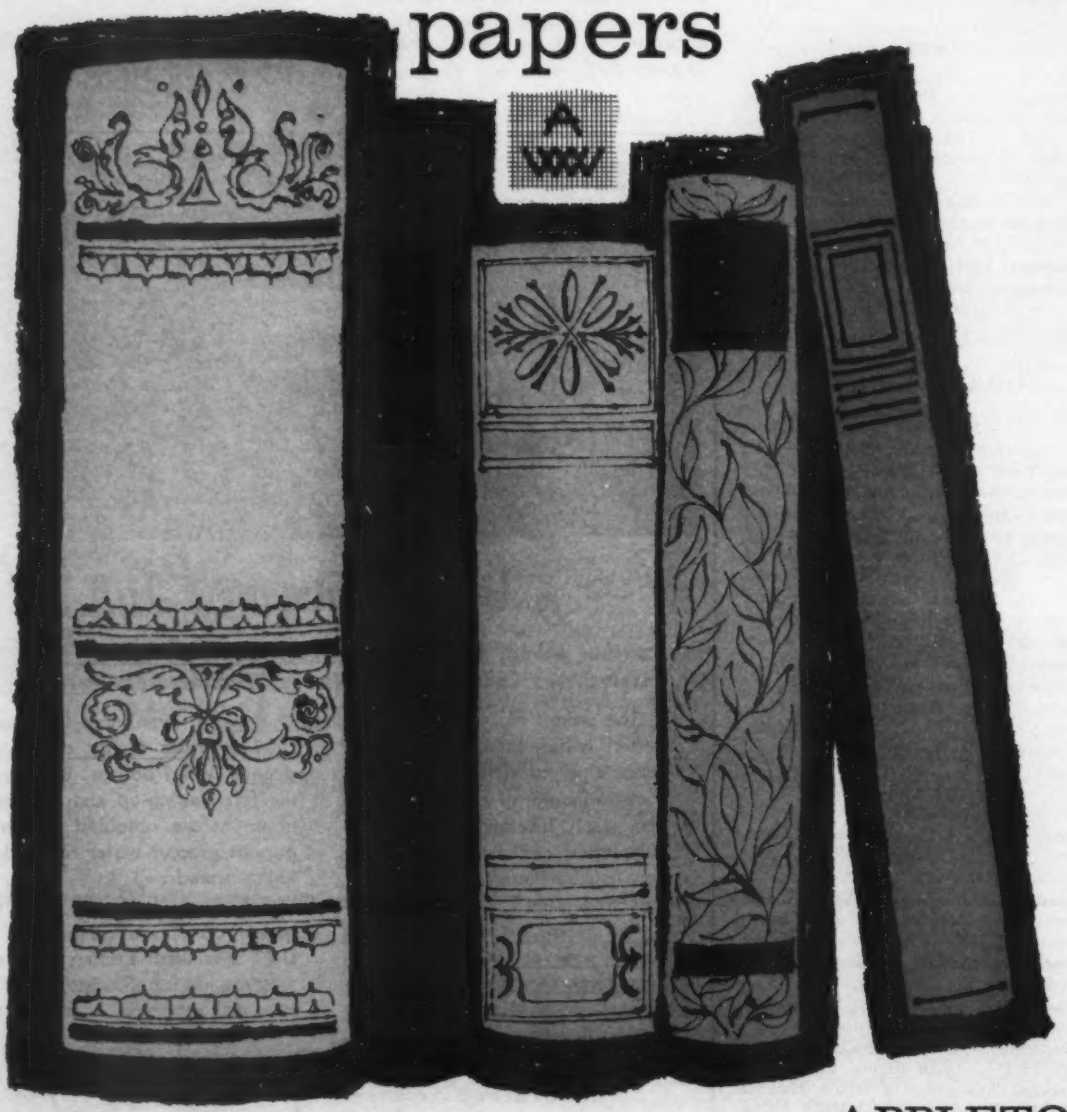

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News of the Industry . . .

IMAC ML-5 heat seal, is a new and improved label paper for prepackaging meat, cheese and other refrigerated products in the super market and packing plant. This new heat-seal grade, developed by *Nashua Corp.*, is designed to eliminate losses due to damage of sensitive packaging films and products in the process of labeling.

Hinde & Dauch Div., West Virginia Pulp & Paper Co. of Sandusky, Ohio, has found that the use of the company's corrugated boxes made of new M/R board has improved the produce packaging field. These new boxes—a recent development of the Hinde & Dauch Division—provide the resistance to rugged handling and extreme temperature and humidity variations required for packing and shipping top-iced and hydro-cooled produce. The boxes were put to test during a recent shipment of onions from Phoenix to Milwaukee. The result—After seven days in transit, the onions arrived at the market fresh and crisp and the boxes were firm and sturdy.

Chippewa Plastics Co. of Chippewa Falls, Wis., has designed a new series of polyethylene films for general overwrap applications. The company identifies the films as the OW-20 series. They are expected to have wide use in packaging of paper napkins and other paper products, textiles, clothing and other soft goods. Sealing characteristics are said to be excellent and have the required stiffness and machinability for efficient packaging. They are available in various gauges.

Nine-month report on safety contest

FOR THE NINE MONTHS ended September 30, some 397 contestants reported perfect scores in the 1959 Paper Industry Safety Contest sponsored by the National Safety Council. The number of mills reporting stands at 701.

Last year's nine-month record was 121 perfect scores in a "field" of 676.

The January-September frequency rate for all divisions (except pulpwood logging) was 7.25, a 4-per-cent increase from the same period in 1958. In the Pulp & Paper Division, the nine-month rate was 6.61, an increase of 1 per cent from a year ago. In Paper Converting, a rate of 8.59 meant a 7-per-cent increase from the first nine months of 1959. Pulpwood Logging reported a rate of 33.67, down 7 per cent from last year.

Contestants working the most manhours in the January-September period without lost-time accidents were: the Belgo Division of Consolidated Paper Corp. Ltd.; the Laurentide Division of Consolidated Paper Corp. and National Gypsum Co. of Mobile, Ala.

From the eligible mills in Division I, the board of judges will choose the mill with the most outstanding record. This plant will be awarded the grand prize—the Edward Benton Fritz Memorial Trophy—during the National Safety Congress in October. The trophy is presented each year by Fritz Publications Inc., publisher of THE PAPER INDUSTRY.

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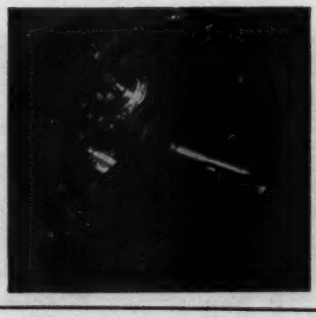

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NAMES *in the* NEWS

Champion Paper & Fibre Co.

The research and development division of Champion Paper & Fibre Co. has made the following promotions and position changes:

Roger Warner has been promoted to manager of the division's engineering department. He replaces Robert Forrest, who has been made assistant director of general plant engineering, operations group.

Preston Daneff has been promoted to electrical research and development group leader.

John Teare has been named manager of the division's patent, information and technical services department. He replaces T. Edward Knapp, who has been named to head Champion's European and licensing division.

Irvan D. Carberry has been named manager of business and personnel administration for the division.

Harold Joiner has been named administrative assistant to the director of research and development.

In addition, a chemical products research group has been established to explore possibilities in the production of chemical raw materials, by-products and new products. Named to this new group were: Cornelius Betten, Harold Judd and James Stone.

The Chamber of Commerce of Greater Philadelphia has presented its William Penn Award to Thomas B. McCabe, president of Scott Paper Co. for his "Outstanding record of service to American free enterprise through his achievements as an industrialist, as a government official and as a member of the community." From left to right are: James M. Symes, chairman of the board of the Pennsylvania Railroad; Andrew B. Young, president of the Chamber and Thomas McCabe.

Scott Paper Co.

Francis W. Plowman, vice president and director of Scott Paper Co. has recently been named the company's first director of customer relations. In his new post, he will assist all branches of Scott's sales organization in developing programs and policies best suited to the mutual needs of the company and its customers.

The field sales organization of Scott has made changes which affect the responsibilities of its members.

Paul Brown, who has been Scott's national retail sales manager, will continue to provide direction of that organization as Scott's director of retail sales. To assist Brown in providing operational direction, the following three sales managers have been appointed: George Wilcox as northern sales manager; Vernon Tessier as central sales manager; and Frank O'Brien as West Coast sales manager.

In conjunction with the above changes, two men have been promoted to the posts of division manager. George Rivnak has been named divisional manager in Philadelphia and Everett Frank has been named divisional manager in New York.

Corn Products Co.

Five vice presidents have been appointed for the new and reorganized Corn Products sales division.

Robert W. Bond, vice president, marketing planning; Darrel K. Brickley, vice president, sales services; Jenkin J. Jones, vice president, refined and processed oils; John M. Krno, vice president, sales promotion and development; and Henry M. Mays, vice president, feed and by-product sales.

This new division will be responsible for the sales and merchandising of all industrial products, including those previously handled by the company's Best Foods Division.

Diamond Hoosier Containers Inc.

Norris J. Downing has been named president of Diamond Hoosier Containers Inc. He will succeed J. C. Behringer, who is resigning as head of the wholly-owned Diamond National subsidiary.

Hoosier Containers was merged into Diamond National Corp. two years ago.

Mead Corp.

Alan H. Temple, vice chairman of the First National City Bank of New

(Continued on page 764)

R. Warner

P. Daneff

J. Teare

I. Carberry

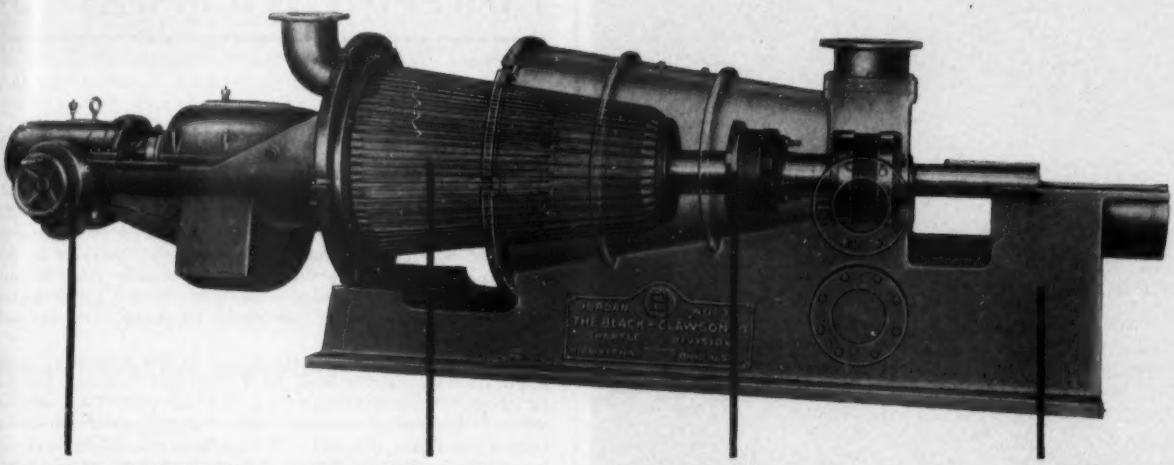
H. Joiner

C. Betten

H. Judd

J. Stone

How to Cut Costs of Labor, Maintenance and Downtime



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FOREIGN ABSTRACTS

Parameters of neutral sulfite semichemical pulping

Three articles in this area have come from the Research Institute of Pulp & Paper in Bratislava. The first of these deals with the relationship between the so-called "theoretical chemical consumption" and the properties of beechwood pulp prepared by the NSSC process (The term "theoretical" apparently refers to the difference between the amount of chemical, notably sulfite, added to the cooking liquor and the amount of chemical not utilized in the digestion).

The NSSC cooks were carried out in the laboratory with sodium sulfite, ranging from 4.8 to 40.1 per cent and sodium bicarbonate varying from 1.9 to 15.7 per cent. The ratio of sulfite to bicarbonate was kept constant at 5:2, and in all cooks, the solid-to-liquor ratio was 1:5 and the maximum temperature was 170° C. The lignin content dropped and the pulp brightness and sulfite consumption increased by increasing the chemical concentration up to 15 per cent sulfite, which corresponded to a "theoretical" consumption of 12 per cent. Further increases in chemical did not change the lignin content of the brightness of the pulp. For all chemical concentrations used, little change was noted in such physical pulp properties as breaking length, burst or folding endurance. Apparently the most economical liquor composition was when the pH range was maintained between 6.8 and 7.5, using a sulfite content corresponding to a "theoretical concentration" of 12 to 12.5 per cent for bleachable pulps and 7 to 8 per cent for pulps used in paperboard production.

The second paper deals with the chemical recovery in the NSSC process. Such a recovery is only profitable provided it gives a positive heat balance. This is achieved only if the process is carried out so that spent liquors are actually suitable for recovery and provided the recovery plant equipment is adapted to the requirements of such liquors. The total dry solids content in the spent liquor will determine the capacity of evaporators and burners. Initially, the spent liquor must have a concentration of solids not below 12 to 14 per cent; the composition of this spent liquor is also very important. For example, the solubilities of sodium sulfite and sodium carbonate decrease on evaporation which must be carried out so as to prevent the formation of deposits. Thus, when the inorganic salt content reaches about 40 per cent of the total solids in the spent liquor, such a solution can be evaporated in tubular evaporators to only 45 per cent dryness. Content evaporators must be used for any further evaporation. The NSSC spent liquors have a relatively low heat of combustion. Hence, additional gas or petroleum fuels must be added; and the burners must be capable of, and properly equipped for, this type of firing.

The third paper in this series deals with the relationship between the solids-to-liquor ratio and chemical consumption. Beechwood digestions were made using a constant sulfite content of 25.2 per cent. It was shown that with increasing liquor-to-solids ratios from an initial 5:1 to 10:1 and then 20:1, the pulp yields increased but the per cent lignin in the pulp also increased and the brightness decreased. The hypothesis offered is that there are differences in the concentration gradients and hence in the diffusion rates between the chips and the liquor. In practice, a reduction in the liquor-to-solids ratio may be obtained by withdrawing a part of the liquor after a thorough impregnation of the chips. This does not reduce the actual "theoretical consumption" but it does reduce the practical consumption of sodium sulfite because the chemicals in the withdrawn portion of the liquor can be used in impregnating a new batch of chips.

In the case of beechwood, the withdrawal of 35 to 50 per cent of the cooking liquor and 25 to 30 per cent in the case of aspen digestions had no unfavorable effects on the strength properties of the resulting pulps. In fact, the breaking length and the folding endurance actually increased. Complete liquor

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withdrawal and cooking in the vapor phase, had distinct disadvantages — although apparently satisfactory because of the low consumption of chemicals and a shortened digestion period. It had an adverse effect on the strength properties of the pulp, which seemed contingent on an accumulation of reaction products in the chips. This loss in strength was less evident in the case of aspen than for beech. The possible reasons for this are discussed. Evidently the composition of the wood species and the ease of penetration serve as important factors.

Advantages of NSSC pulping with partial liquor removal are: (a) reduced sulfite and steam consumption; (b) shortened cooks; and (c) increased heat of combustion of the spent liquors.

The first paper is by J. Janci and J. Fellegi, *Papier a celulosa* 14, 2 to 5 (1959) (original in Slovakian with summaries in Russian, German and English). The second is by V. Kubelka Jr. *Ibid* 14, 25 to 27 (1959) (in Czech with summaries, as above). The third is by J. Fellegi and J. Janci *Ibid.* 14, 99 to 102 (1957) (original in Slovakian with the usual summaries) (through the *Abstract Bull. Inst. Paper Chem.* 30, 214, 215 and 226 (1959).

Comparison of two woolen felts

Two felts, having the respective basis weights of 3500 and 2100 g./sq. m., were compared with respect to drying capacities and steam economy. The lighter of the two was shown to provide higher drying capacity and a better steam economy.

Sven Ponton. *Svensk Papperstidn.* 62, 749 to 750 (1959) (in Swedish, with brief English summary).

Stereoscopic electron micrographs of pulp and paper

In a series of earlier studies, using electron micrographs, the authors described the formation of fiber-to-fiber bonding during the drying of paper sheets. Freely suspended cellulose membranes, on drying, form ringlike net structures, provided the microfibrils are oriented randomly. Thread-like structures are formed when the microfibrils are parallel to each other.

The present paper shows 12 stereoscopic electron micrographs, which range from technical bleached kraft pulp to heavy, loaded papers. These micrographs show the process of fiber-to-fiber bonding that takes place on drying. When the thin-walled springwood fibers dry, they apparently collapse. They do not flatten out, but take on a double "T-beam" structure. Summerwood fibers usually maintain their tube-like configuration. The outer portion of the secondary wall forms wrinkles that run in the axial direction, resulting from the effects of delignification and the apparent enlargement of this wall in its relationship to the inner portions of the fiber.

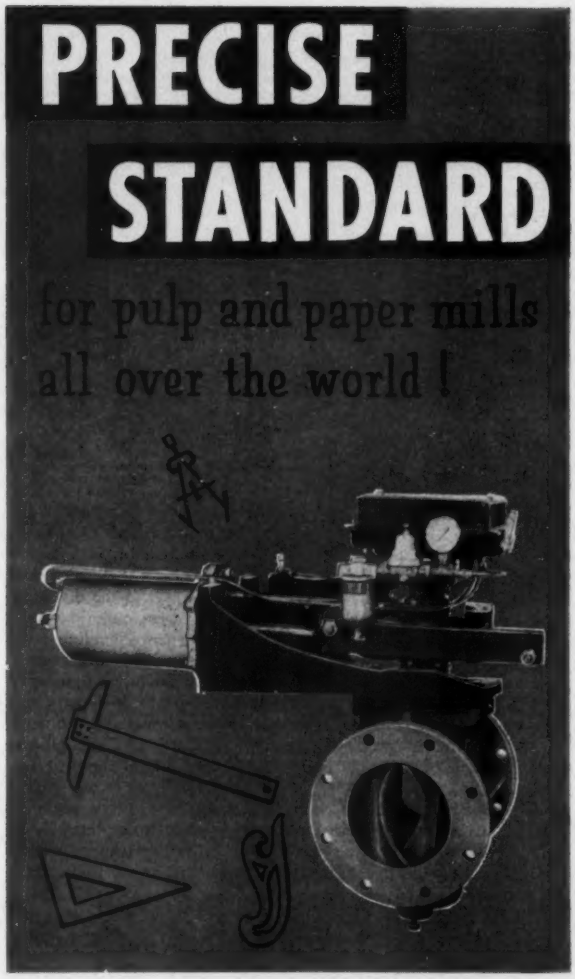
Some of the photographs show the surfaces of coated papers which hold particles of fillers, and the authors have the impression that the paper strength properties (especially folding endurance) are decreased by the compact and sharp-edged particles of these loading materials.

Georg Jayme and Günther Hunger. *Holzforschung* 13, 1 to 6 (1959) (in German with English summary).

Digestibility of high yield chemical pulps

The study used rams as experimental animals and tested the digestibility of 40 different unbleached pulps prepared by 10 different pulping methods. The usual raw material was birchwood although some spruce was also used. The pulping procedures included the usual calcium bisulfite method; the NSSC; various kraft procedures (in a number of which elementary sulfur was added to the cook), soda cooks; several nitric acid digestions at relatively low temperatures followed by addition of alkali or sodium bicarbonate; a few chlorite delignifications; a cold soda treatment; and a sulfurous acid digestion.

These pulps were used as fodder; the digestibility of the crude carbohydrates of the cellulose fodder gave a more accurate picture of the digestibility of the pulp than did the uncorrected values of the digestibility of the organic matter in the pulps. The digestibility of these crude carbohydrate fractions varied from 27.5 to 89.9 per cent. An additional demand for digestible protein averaged about 33 g. per kilogram of dry pulp. In general, the pentosans in the pulps, irrespective of the wood species, were considerably more digestible than was the (so-called) cellulose-lignin portion of the pulp; these pentosans were also more digestible than were



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those in the hay that was used as the basic fodder. It was found that in order to prepare pulp of high digestibility, it was essential (as far as possible) to avoid dissolving out or of hydrolyzing the pentosans during the pulping operation. It was also important to keep the lignin content in the pulp as low as possible in its relation to the actual cellulose content.

For example, in Fig. 1 the effect of the lignin to the cellulose

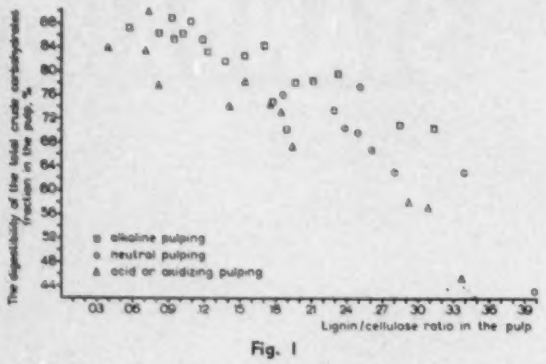

The digestibility of the total crude carbohydrates fraction in the pulp, %
Lignin/cellulose ratio in the pulp
alkaline pulping
neutral pulping
acid or oxidizing pulping

Fig. 1

ratio on the digestibility of the crude carbohydrates in the pulp is indicated, and despite the scattering, it is evident that, in general, the lower the lignin to cellulose ratio, the higher is the digestibility. Pulps made by the various alkaline processes, on the average, proved somewhat more easily digestible than corresponding pulps that had undergone acid or chlorite treatments. This difference is ascribed in the main to the digestibility of the cellulose-lignin portion which varied over a wide range (*i.e.* 34.7 to 86.4 per cent), depending on the method of preparation, and was due primarily to the amounts of residual lignin in this fraction. This lignin to cellulose ratio also seems to affect the digestibility of the pentosans on the pulp.

Forty-one references are given. The pulps were prepared in experimental digesters in the Finnish Pulp and Paper Research Institute. The digestion trials were made at the Department of Animal Husbandry of the Agricultural Research Center. P. Saarinen, W. Jensen and J. Alhojärvi. *Acta Agralia Fennica.*, No. 94, 3 (1959) (in English).

Expansion of the S.I.C.A.

The Société Industrielle de Cellulose d'Alizay (S.I.C.A.) was the first French mill to produce bleached kraft hardwood pulps, using largely beech with some hornbeam as raw materials. Since its inception in 1955, expansion has been rapid. In 1956, its total production was 33,000 tons. Its present capacity is 50,000 tons. Approximately 80 per cent of this output enters the textile industry, and the rest is used in papermaking.

Recent changes in the S.I.C.A. mill include the installation of a fifth digester and fifth diffuser, reconstruction of cooking liquor and bleaching departments, modernization of the wet machine, installation of pilot plant equipment for log barking by means of steam (using a method patented jointly by the S.I.C.A. and Cenpa), and more effective utilization of spent liquor by the manufacture of furfural and road binders (in powdered form). The latter are used for road construction in the Sahara petroleum fields.

Anon. *Papier, carton et cellulose* **8**, No. 2, 83 to 88 (June 1959) (original in French with summaries in English, German and Spanish) through *Abstr. Bull. Inst. Paper Chem.* **30**, 330 (1959).

Status of the kraft pulping process

This is the first of two papers, and gives a rather comprehensive literature review which, however, makes no claim to complete coverage. Many of the references are recent. The article deals with world production of sulfate pulp, kinetics of the pulping process, the influence of process variables, special modifications of the sulfate digestion, stepwise delignification, prehydrolysis followed by kraft pulping, catalysts and increased reduction potentials, continuous pulping, the adaptation of the kraft process to various wood species, and the influence of variables in tree growth.

There are approximately 150 references. Hermann F. J. Wenzl. *Holzforschung* **13**, 97 to 112 (1959) (in German).

Borohydride reduction of pulps

The carbonyl groups in pulps are reduced by sodium or potassium borohydride, but this reduction is impeded by the fact that in water suspension, the borohydrides themselves are destroyed. It was shown that the reducing effects (as measured by decreases in copper numbers) could be increased if the borohydride reaction is carried out in the presence of certain lithium, barium, calcium or magnesium salts. When the reduction is carried out in a suitably buffered system and the rapid decomposition of the borohydride is prevented, this same effect was also obtained with aluminum, zinc and cadmium ions. These effects are as yet unexplained. In the degradation of the borohydride, water itself is reduced with the formation of hydrogen (and sodium metaborate).

A series of commercial wood pulps were reduced with varying amounts of sodium borohydride. When carried out suitably, the borohydride reduction also gave a certain increase in (cuprammonium viscosity) and in brightness.

As a result of these experiments, it is concluded that, on the average, approximately half of the brightness reversion may be ascribed to carbonyl groups, and in many cases the end-group carbonyl appears to contribute to the brightness reversion in the pulps. However, the resin content of the pulp also has a measurable effect. Brightness reversion was measured by forced aging, both of the untreated and of the pulps treated with varying amounts of borohydride. The reaction was carried out by heating 16 hours at 120°C., then noting changes in brightness, and was expressed as the pc. value and plotted against the copper number.

In the reduction of the pulps, there was little change in carboxyl content. The brightness values before and after forced aging, with and without treatments of varying amounts of borohydride are

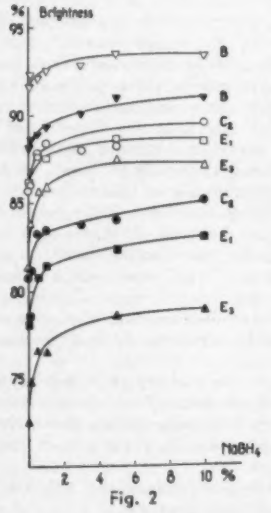


Fig. 2

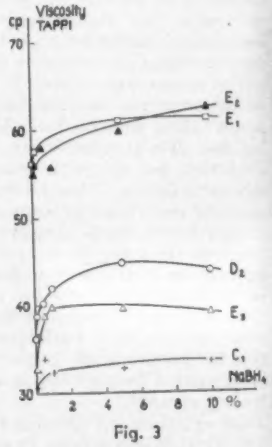


Fig. 3

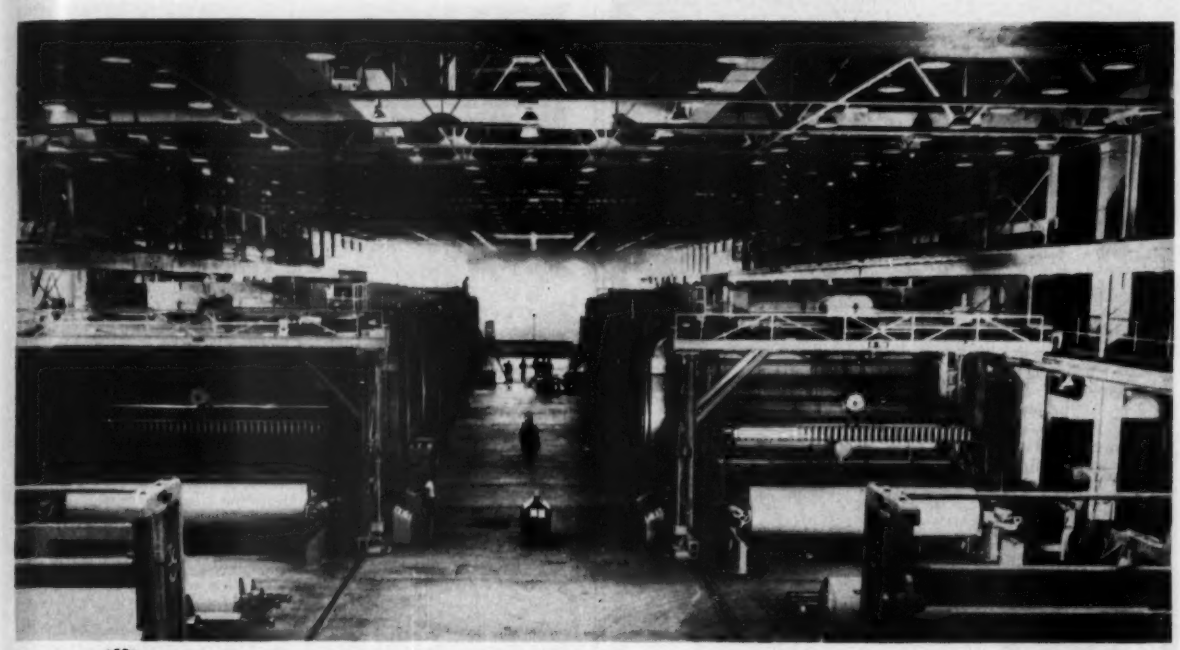
shown in Figure 2. Here the colorless circles, trangles or squares used in the graphs, mark the brightness prior to aging and the corresponding black circles *et al* show the effects of aging. Here, B = a cold alkaline-treated sulfite pulp; C_2 = a pine kraft pulp of the dissolving type; E_1 = a kraft paper pulp; and E_3 = another kraft paper pulp. Figure 3 shows the increase in cuprammonium viscosity (using a 1-per cent pulp solution) of various pulps after reduction with varying amounts of borohydride; here D_2 = a spruce sulfite paper pulp.

Forty-three references. Ingvar Jullander and Kurt Brune. *Svensk Papperstidn.* **62**, 728 to 736 (1959) (in English).

Douglas fir; possibilities of its uses in French papermaking

The author, relying largely on American publications, outlines the habitat and properties of Douglas fir, the texture and composition of the wood, its utilization other than in papermaking, methods of pulping, its use in board manufacture and suggested uses of its bark. Its possible culture and utilization are discussed briefly.

A. Matagrin. *Papeterie* **81**, 471 to 473; 541 to 545 (1959) (in French).



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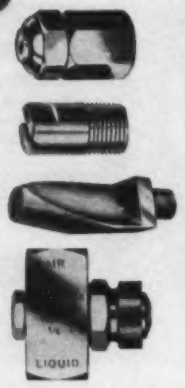

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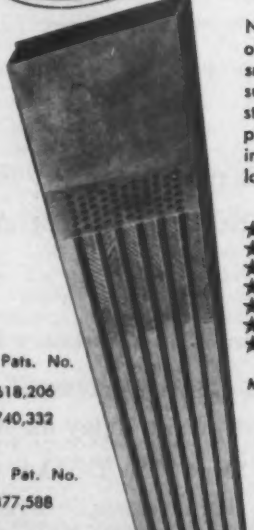

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2,740,332

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PATENT REVIEWS

MELVIN NORD*

Paper-machine dryer

U.S. 2,892,263, issued June 30, 1959, to Lloyd Hornbostel and assigned to Beloit Iron Works, describes an improved paper machine of the type referred to as a "Yankee dryer" machine.

In accordance with the instant invention, a number of successive Yankee dryer drums are mounted in a paper machine so as to permit partial casting of the web on the first of such drums to receive the web, and final casting of the web on the last of such drums to receive the web. By this arrangement, the first drum to receive the web can be operated at less than the conventional dryer-drum temperature, if desired, so as to pick up a wetter web than could ordinarily be cast on conventional Yankee dryer drums. Only partial drying of such web is accomplished on the first drum. Successive drums may be employed in like manner or only a second drum may be employed. The last drum in the machine must, however, receive the web in wet enough condition to adhere to the drum surface and effect casting thereof on such drum surface; but it has been found that the moisture content of the web thus used can be much less than the moisture content of the web that is cast onto a single Yankee dryer drum in conventional operation.

Thus, the total amount of water, removed from the web by the final dryer, is much less than in an ordinary dryer, and the operating speed and capacity are therefore considerably increased.

Production of fiberboard from desert shrubs

U.S. 2,898,260, issued Aug. 4, 1959, to Julius F. T. Berliner, describes a process for producing hardboard from wood tissue of desert shrubs.

The wood fibers naturally contain constituents productive of binders which bond the fibers together to form a strong and highly moisture repellent board. Among the desert shrubs which can be used in this way are the creosote bush, mesquite, blackbrush and sagebrush.

After digestion for a time sufficient to convert the pentosans to furfurals, and for the latter to react with the other constituents of the wood to form precursors of thermosetting binders in the wood fibers, a felted sheet of the fibers is formed and is then dried. The dried sheet is heated to a temperature of 400 to 500°F. and pressed with a pressure of 700 to 1400 psi between the platens in order to consolidate and bond the wood fibers into a hard thermoset sheet.

Thermoplastic paper

U.S. 2,899,351, issued Aug. 11, 1959, to Edward A. Morse and assigned to Personal Products Corp., describes a method of manufacturing thermoplastic papers from wood pulp fibers, synthetic fibers of a vinyl chloride-acrylonitrile co-polymerization product, and synthetic fibers of a vinyl chloride-vinyl acetate co-polymerization product.

Production of aluminized paper

U.S. 2,897,095, issued July 28, 1959, to William B. Wolfson et al and assigned to National Research Corp. and Consolidated Paper Bag Co., relates to the production of aluminized paper.

It has been found that water glass, if properly applied to paper, makes an excellent base for aluminizing. The water-glass coating is preferably applied in two relatively thin films, preferably applied under pressure, and preferably baked. The paper is then aluminized by being passed, under a one-micron vacuum, over a source of aluminum vapors.

Printing of corrugated board

U.S. 2,893,320, issued July 7, 1959, to Rexford W. Jones and assigned to Fort Wayne Corrugated Paper Co., relates to the printing of corrugated fiberboard.

It has been found that by the use of an offset blanket having an effective surface hardness of 20 to 40 durometer, it is possible to

*Patent attorney, 17600 Pinehurst, Detroit 21.

print on the facing liner of corrugated board by the dry relief offset process. The prints obtained are sharper and reproduce in much finer detail than is possible with rubber dies. It is even possible to print photographed subjects on the corrugated board.

Fibreboard apparatus

U.S. 2,890,748, issued June 16, 1959, to Ludwig K. Heinrich and assigned to the Celotex Corp., describes an improvement in apparatus for making fibreboard, involving a modification of the bottom felt arrangement of the press section.

Means are provided for the escape of the excess water as it is squeezed from the sheet by the squeeze rolls, so that there is much less tendency to build up a pond behind the squeeze rolls. This means includes an endless link belt which is installed to encompass a portion of the periphery of the lower press roll and is interposed between the periphery of the press roll and the lower felt.

Latex-impregnated paper

U.S. 2,897,094, issued July 28, 1959, to Norman J. Hayes and William C. Ross and assigned to W. R. Grace & Co., relates to the impregnation of paper with latex for use as a leather substitute.

In order to overcome weakness and low abrasion resistance when wet, the latex-impregnated paper is treated with a solution of an isocyanate (e.g. phenyl isocyanate).

Manufacture of resin-impregnated paper

U.S. 2,895,868, issued July 21, 1959, to Donald G. Magill, Jr. and assigned to Riegel Paper Corp., describes a method for manufacturing high porosity resin-impregnated paper suitable for use as an oil filter paper.

In Fig. 1, there is illustrated a washer 10, in which the pulp

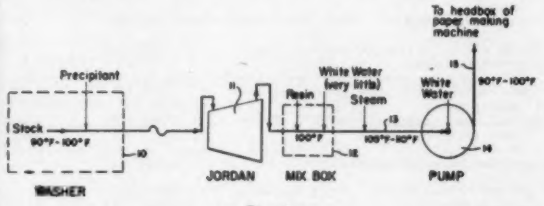


Fig. 1

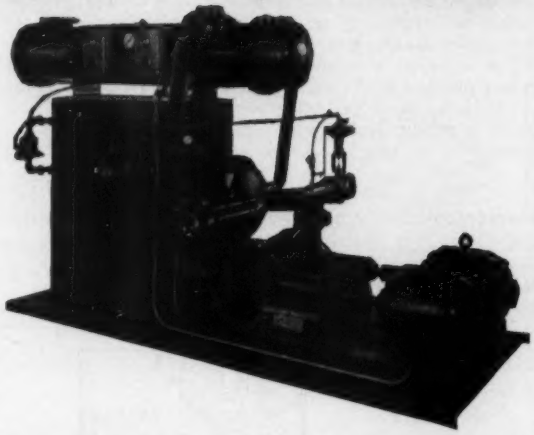
slurry may be prepared. The temperature of this stock may be raised, if necessary, to 90° to 100° F. by the addition of steam. The precipitant is added to the stock in the washer. From the washer 10, the pulp-precipitant mixture is fed to the inlet of a Jordan-type refiner 11, where it is beaten further. It is discharged from the refiner 11 into a mix-box 12, where its temperature is raised slightly by the addition of a small amount of white water. The resin, which is of the beater addition type, is added in the mix box. Some of the resin will immediately adhere to the fibers of the pulp in the mix box. From the mix box, the precipitated pulp-resin slurry is fed through a conduit 13 to a pump 14, by which it is raised through another conduit 15, to the head box of a paper making machine not shown. During its travel through conduit 13 and pump 14, the precipitated pulp-resin slurry has its temperature raised about 10° to a point above the sticking-point temperature of the resin. The injection of steam should be made at a sufficient distance rearwardly of the pump 14 so that all of the slurry is uniformly heated and the precipitated resin has time to be deposited on the pulp fibers. At the pump 14, white water is added in considerable quantity and at such a temperature as to lower the temperature of the slurry to a point below the sticking point of the resin. This cooling of the slurry prior to depositing it on the screen of the paper-making machine is necessary in order to prevent any sticking of the resin or resin-coated fibers to the screen.

Manufacture of paper-like materials from thermoplastic, synthetic materials

U.S. 2,891,279, issued June 23, 1959, to Wilhelm Neumann and assigned to C. F. Roser G.m.b.H., describes a process for the manufacture of paper-like materials in the form of comparatively-thin flat layers, starting from thermoplastic synthetic fibers.

According to the invention, fibres of thermoplastic, synthetic materials which are in a loose web or fleece formation, or in felted

The Only Vacuum Pump Designed Exclusively for Paper Machine Drainage



Here are 7 big reasons why the Stickle jet-type vacuum pump provides better paper machine drainage at lower cost—year after year:

1. Designed Exclusively for Paper Machine Drainage. The only vacuum pump engineered to meet the particular problems of paper machine drainage.

2. Maintains Higher Efficiency Longer. Keeps dryers free of condensate and air; returns condensate to boiler room at maximum temperature. Efficiency is maintained year after year because there are no close tolerances to cause wear and loss of vacuum.

3. Fewer Failures. Duplex model has duplicate pumps, motors and controls to prevent costly interruptions. Standard horizontal motors are readily available if replacement is necessary.

4. Built-in Heat Exchanger. The only vacuum pump with built-in heat exchanger. There's no need for costly cooling equipment or for mixing corrosive raw feed water to condensate return.

5. Shorter Heat-up Period. Increased production due to shorter heat-up period possible with a Stickle vacuum pump will often pay for the unit in less than one year.

6. Lower Maintenance Cost. Requires less time and expense to service. All floats are housed in exterior float boxes. Vacuum chamber is interchangeable. Ejector tubes may be inspected without moving motor, pump or piping. Standard horizontal motors are easily replaced. And, there are no close tolerances to cause excessive wear.

7. Greater Flexibility. A future increase in capacity of 25% is possible at small cost, due to a special built-in feature. Drying pressure changes may be handled automatically.

The Stickle vacuum pump handles vacuums up to 28″ with 90° condensate. Single and duplex models, each in 11 sizes. Capacities for single model up to: 150 GPM (water) and 150 CFM (air); or 450 GPM (water only). With duplex model, these capacities are doubled. Every installation guaranteed. So, if you want better paper machine drainage at lower cost, get the full story on the Stickle vacuum pump. Write for free bulletin No. 260.

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Vacuum Pumps
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form, are stuck by using pressure exerted only at individual and, preferably, uniformly distributed points or positions on the surface, the sticking occurring at the points of contact. The process is preferably effected under heat and without the use of adhesives. The amount of pressure, and the temperature or the duration of the heat treatment, must not be such that the fibres run into one another to form a foil.

Wet-strength tester

U.S. 2,893,241, issued July 7, 1959, to Henry T. Fisher and James Moran and assigned to The Ontario Paper Co. Ltd., provides a method of determining the strength of a wet paper web.

The invention consists in a method of forming a wet-paper test sheet on a forming wire which is split on a center line and subsequently placing the forming wire, with the test sheet intact on it, in a device by which the two portions are displaced from each other so as to cause rupture of the sheet. The force required gives a measure of the zero-span tensile strength of the wet-paper test sheet.

Chemical recovery apparatus in pulp manufacture

U.S. 2,891,843, issued June 23, 1959, to Harold J. Moxness and assigned to Minnesota and Ontario Paper Co., describes an apparatus for recovery of chemicals from a pulp residual liquor.

In Fig. 2, numeral 10 denotes a furnace in the bottom of which

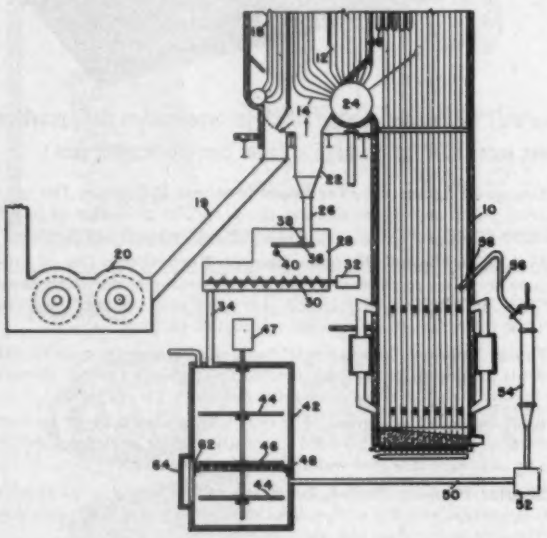


Fig. 2

is a smelting zone. This furnace is lined with exposed, tubular water-walls, forming a part of the waste-heat boiler. Above and to one side of the furnace is the boiler proper. It has upright tubes 12 and 14 baffled so that the gas stream from the boiler furnace-chamber passes into the upper portion of the first bank and then downwardly over the bank of tubes 12 and across the lower portion thereof and upwardly over the bank of tubes 14. Immediately in advance of the first bank of tubes is a superheater 16 shielded by a row of boiler tubes. To the rear of bank of tubes 14 is a down pass in which a bank of tubes 18 is located. The waste gases leaving the boiler, enter the evaporator 20 by conduit 19 and are eventually discharged into a duct to the stack (not shown). The hopper 22 is located immediately to the rear and below the mud drum 24 and communicates with the lower portion of passes containing tubes 12 and 14 of the boiler.

The black liquor, after having been concentrated to a desired density in evaporators (not shown), is introduced into evaporator 20 from which it is delivered to the salt-cake mixing tank 42 by means not shown. In the mixing tank 42, the black liquor is mixed with salt-cake, delivered from the container 28 by conveyor 30 and passage 34. The container 28 receives fly ash and precipitates chemicals from stack gases and salt cake by suitable means (not shown). The conveyor 30 is operated by variable-speed controllable motor 32. The mixing tank 42 is provided with stirring devices as paddles 44 and 46 and is driven by a suitable motor 47. The black liquor from tank 42 is then pumped to the furnace through pipe 50 by means of a pump 52 through pre-heater 54, pipe 56 and spray nozzle 58. The dense liquor is sprayed into the furnace by nozzle 58 where the spray encounters the ascending flame-stream. The particles, in gravitating to the hearth, are dried and collected in a bed. Air is admitted through a bed in an amount sufficient to maintain reducing atmosphere. Reduction of the chemical takes place and it runs in molten form from the hearth. The solid carbonaceous matter in the dried particles is burned. The combustibles in the gas, arising from the bed, encounter an oxidizing atmosphere and are burned. For this purpose additional air is admitted.

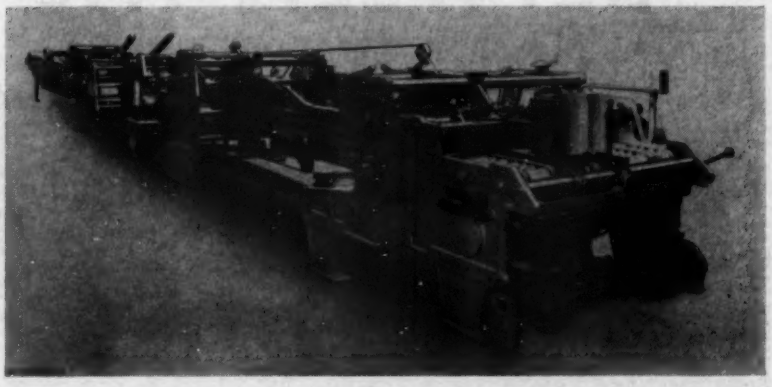
Chemicals are, of course, present in the rising flame and gas stream in the form of vapor. This vapor is condensed by the absorption of heat by the steam generating and other surfaces of the boiler unit of the installation. It condenses largely in the form of dust, and due to the reversal direction of the waste-gas stream from passes containing tubes 12 and 14, dust separates out and settles out into the hopper 22. Such particles as deposited on the boiler tubes and other parts are from time to time removed therefrom by suitable means. The particles settling in hopper 22 pass through conduit 26 to container 28. When a predetermined amount of dust is deposited upon member 36, which closes the end of conduit 26, the dust is discharged into container 28. Salt cake from container 28 passes through pipe 34 and into the salt-cake tank 42.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Combination printing and die scoring and cutting presses for paper box blanks	Harold R. Wittrock	2,892,390	6/30/59
Paper-machine headbox	Anglo Paper Products, Ltd.	2,892,499	"
Obtaining a glossy-wax coating on paper	American Can Co.	2,892,735	"
Paper-machine dryer condensate control	Beloit Iron Works	2,893,136	7/7/59
Firing steam generators with evaporated sulfite waste liquor	Bengt T. Brunes	2,893,333	"
Horizontal corrugated paper tube	Walter J. Mann et al	2,893,436	"
Silencers for suction rolls	Beloit Iron Works	2,893,487	"
Carrier cartons	The New Haven Board & Carton Co.	2,893,593	"
Non-bulging fruit box	Crown Zellerbach Corp.	2,893,617	"
Individual condiment containers	Frank R. Hill	2,893,618	"
Egg cartons	Walter J. Schwertfeger	2,893,619	"
Hollow-walled folding boxes	Marshall I. Williamson	2,893,620	"
Nestable berry tray	Crown Zellerbach Corp.	2,893,621	"
Display package	Samuel Fogel	2,893,622	"
Radio-tube carton	Sylvania Electric Products, Inc.	2,893,623	"
Bleaching a paper web with peroxide	E. I. du Pont de Nemours & Co.	2,893,819	"
Recovery of heat and chemicals from pulp liquor	The Babcock & Wilcox Co.	2,893,829	"
Manufacture of copying paper	Kee Lox Manufacturing Co.	2,893,890	"
Combined digestion and refining of paper pulp	Bauer Bros. Co.	2,893,909	"
Production of alcohol from waste sulfite cellulose liquor	Phrix-Werke Aktiengesellschaft	2,893,919	"
Carton with adjustable display cover	Joel S. Matteson	2,894,618	7/14/59
Reclosable carton end construction	Fibreboard Paper Products Corp.	2,894,674	"
Molding pulp articles	Diamond Gardner Corp.	2,894,869	"
Multiply bag with supplemental sleeve	Arkell and Smiths	2,895,387	7/21/59
Ground-surfaced laminated paper tubes	Crescent Paper Tube Co. Inc.	2,895,511	"
Bench made of corrugated board	Stanley Spivack	2,895,541	"
Carton	Continental Paper Co.	2,895,662	"
Gift boxes	Richard E. Paige	2,895,663	"
Folding device for paperboard carriers	The Interstate Folding Box Co.	2,896,382	7/28/59
Production of paper yarn	Ronald H. Marks	2,896,393	"
Manufacture of paper straps	Interstate Bag Co., Inc.	2,896,397	"
Manufacture of cushioning paper	Societa per Azioni Fabbriche Fiammiferi ed Affini	2,896,692	"
Digester relief system	The Foxboro Co.	2,896,709	"
Suction couch roll device	Diamond Gardner Co.	2,896,710	"
Suction box cover	John W. Bolton & Sons, Inc.	2,896,711	"
Cartons	Diamond Gardner Corp.	2,896,780	"
Bottle carrier	Diamond Gardner Corp.	2,896,814	"
Packaging with corner saddle means	Lane Container Co.	2,896,832	"

NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.



Straight-line gluer

A new, 180-degree, prebreaking straight-line gluer, called Arrow 50-A, is now available. Exclusive design features of this gluer include power-driven "squaring up" nipper rolls, angular yielding flange cage rolls which keep the cartons always under positive control and eliminate belt-edge wear, a heavy-duty, variable-speed drive for the feed and delivery sections, heavy-duty, power-driven, dual squeeze rolls, etc. *Post Machinery Co.*

Circle No. 13 on Readers' Service Card

Reduced port sleeves

A reduced-port rubber sleeve, offered to the trade for the first time, has many control applications.

With the handling of abrasive slurries, wear on the sleeve would not be as great if the line size were reduced. On existing installations where flow conditions may have changed, a reduced port sleeve will do the job without having to make drastic piping alterations requiring reducers. For new installations, use of reduced port sleeves will give a more streamlined flow pattern of the material.

Available standard sizes range from 1 by 2 in. to 6 by 8 in. Other sizes and combinations are obtainable upon request. *Red Jacket Co. Inc.*

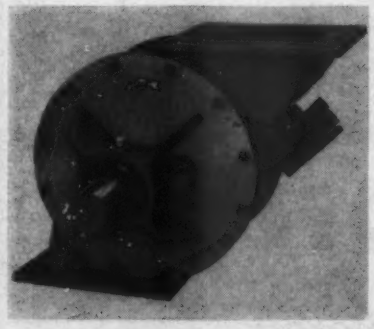
Circle No. 11 on Readers' Service Card

Permanent-magnet pulleys

Indox V permanent-magnet pulleys, now available in diameters from 12 to 48 in., are reported to be suitable for heavy-duty tramp iron removal and cobbing applications.

These pulleys are said to provide performance equal to the most powerful electromagnetic types at a much lower cost. *Stearns Magnetic Products.*

Circle No. 12 on Readers' Service Card



Rotary air lock feeder

A non-jamming, side-entry rotary air lock feeder, now available, handles free-flowing cubes, pellets, chips, flakes, prills, etc. Guaranteed not to crush or grind friable materials, the unit's new construction features are said to eliminate the need for adjustable or flexible tips.

Standard units are available in sizes 2, 2½, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18. Blow-thru units are furnished in sizes 4, 5, 6, 8, 10, 12, 14. Equipped with packing gland seals and outboard anti-friction bearings, all units are manufactured in carbon steel, type 304 or 316 stainless steel, Inconel, Monel and nickel. *Young Machinery Co. Inc.*

Circle No. 14 on Readers' Service Card

Slip-on pipe fittings

Nu-Rail and Speed-Rail slip-on pipe fittings, made of corrosion-resistant aluminum alloy, eliminate threading and welding of pipe and also reduce pipe cutting. Both pipe and fittings may be re-used.

The fittings are used for guard rails, pipe racks, shelving supports, picnic tables, work benches, etc. *Hollaender Mfg. Co.*

Circle No. 15 on Readers' Service Card

Bronze gate valves

A unique product development, solder-joint bronze gate valves with a union bonnet and a rising stem, is now on the market.

Available in sizes ⅜ through 3 in., inclusively, the valves have a pressure rating of 125 lb. The union bonnet is said to eliminate distortion caused by mechanical strain or temperature changes. With the exception of the body of these new valves, designated No. 2SJ, all of the parts are interchangeable with the company's screwed-end, 125-lb., rising-stem gate valves of the same size. *Walworth Co.*

Circle No. 16 on Readers' Service Card

Valve for abrasive slurries

This newly developed valve, for abrasive slurry applications, can be installed in any position and has no slots or guides to interfere with valve movement. Maintenance is reduced to a minimum, since there are no moving parts.

Reported to be suitable for a working pressure of 150 psi, this self-draining valve is available in the following sizes: 4, 5, 6, 8 and 10 in. *United Conveyor Corp.*

Circle No. 17 on Readers' Service Card

Industrial spray nozzle

The Tan-Jet, a solid-cone, centrifugal-type, industrial spray nozzle, is available in

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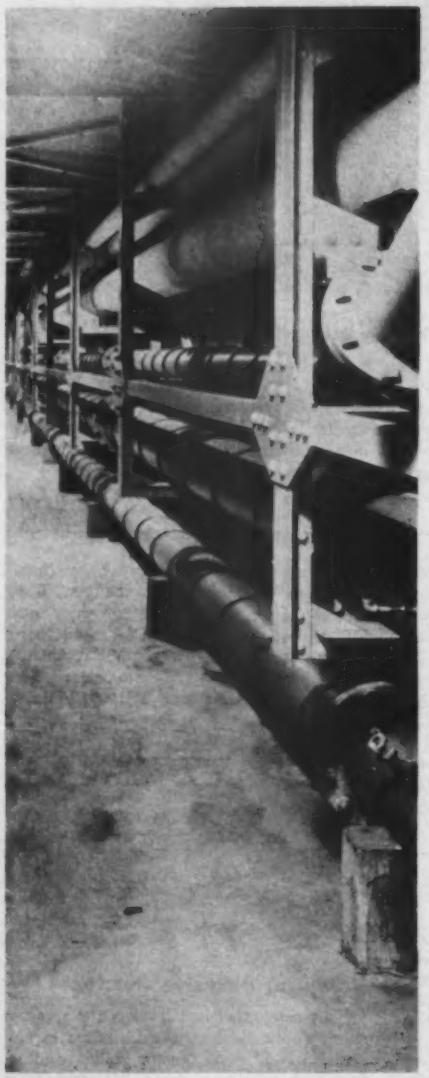

You can count on NAYLOR for pipe fabrications in carbon steel, alloys or stainless steel.

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Pipe sizes range from 4" to 30" in diameter and wall thickness up to 8 gauge; special fabrications from 3" to 44" and wall thickness up to ⅜".

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Standard fittings are available from stock.

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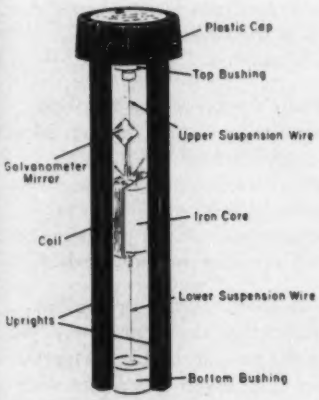
New Products . . .

¼-, ⅜- and ½-in. sizes with male or female connections. Capacities range from 0.50 to 10 gpm at a pressure of 40 lb. psi.

The spray nozzle is obtainable in brass, steel, 303 stainless steel and in other materials upon request. *Wm. Steinen Mfg. Co.*

Circle No. 18 on Readers' Service Card



Multiple-reflection galvanometer

Model 45, a self-contained spotlight galvanometer, is an extremely sensitive indicator for minute d.c. currents and voltages in research as well as in production laboratories. Designed to furnish clear readings conveniently and without eyestrain, this triple-reflection galvanometer also features a smooth wide-range zero control and an easily exchangeable galvanometer element (see illustration) to meet the requirements of a great variety of applications. *Photovolt Corp.*

Circle No. 19 on Readers' Service Card

Close-coupled pump motors

A new line of drip-proof, close-coupled pump motors, now available, are in NEMA rerated frame sizes (182 through 405 U.) which cover ½-hp. motors at 900 rpm through 75-hp. motors at 1800 rpm. Explosion-proof, totally enclosed, fan-cooled motors are obtainable in frame sizes of 182 through 326 U. which cover ½ through 30 hp. at 900 rpm.

These pump motors can be furnished in all frequencies and commercial voltages below 600 v., either two- or three-phase. *Lima Electric Motor Co. Inc.*

Circle No. 20 on Readers' Service Card

Single-control valve

The Monotrol, a patented single-control valve, directs the flow of liquids in zeolite softeners, ion-exchange units and filters. Designed to perform the function of a nest of individual valves while providing greater ease in operation and maintenance, the Monotrol is available in cast iron or in acrylic plastic for corrosive service, and operates manually or automatically.

Valve features include pilot control, positive hydraulic-pressure actuation and easy maintenance. *Graver Water Conditioning Co., a div. of Union Tank Car Co.*

Circle No. 21 on Readers' Service Card

Vat dye

A homogeneous or straight vat brown dye, called Indanthrene maroon-brown B infra paste, produces a maroon-brown shade which is characterized by good fastness on cotton, rayon and other cellulosic fibers. Reported to be a desirable base component in combination with other suitable vat dyestuffs for producing deep brown and chocolate shades, the dye is said to show good resistance of the soluble leuco to over-reduction during application. *Dyestuff & Chemical Div., General Aniline & Film Corp.*

Circle No. 22 on Readers' Service Card

Gages use gamma radiation

Two new gages (models LRV and LR) use gamma radiation to continuously, automatically and accurately measure specific gravity, percentage of solids or interface passage of liquids in 10- through 16-in. dia. pipes.

Both models can be built into lines or bolted around the outside of existing pip-

You'll get exceptionally low "first cost"
You'll use minimum power
You'll need less maintenance
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Kalamazoo "Side Hill" Washer

These practical slide washers give a better and more effective wash job than other washing methods. They may also be used as thickeners and saveralls. These units are designed by Kalamazoo engineers — experts in serving the paper industry for more than 90 years. Our experience enables us to completely prefabricate the units of top quality materials. Installation supervision can be furnished.

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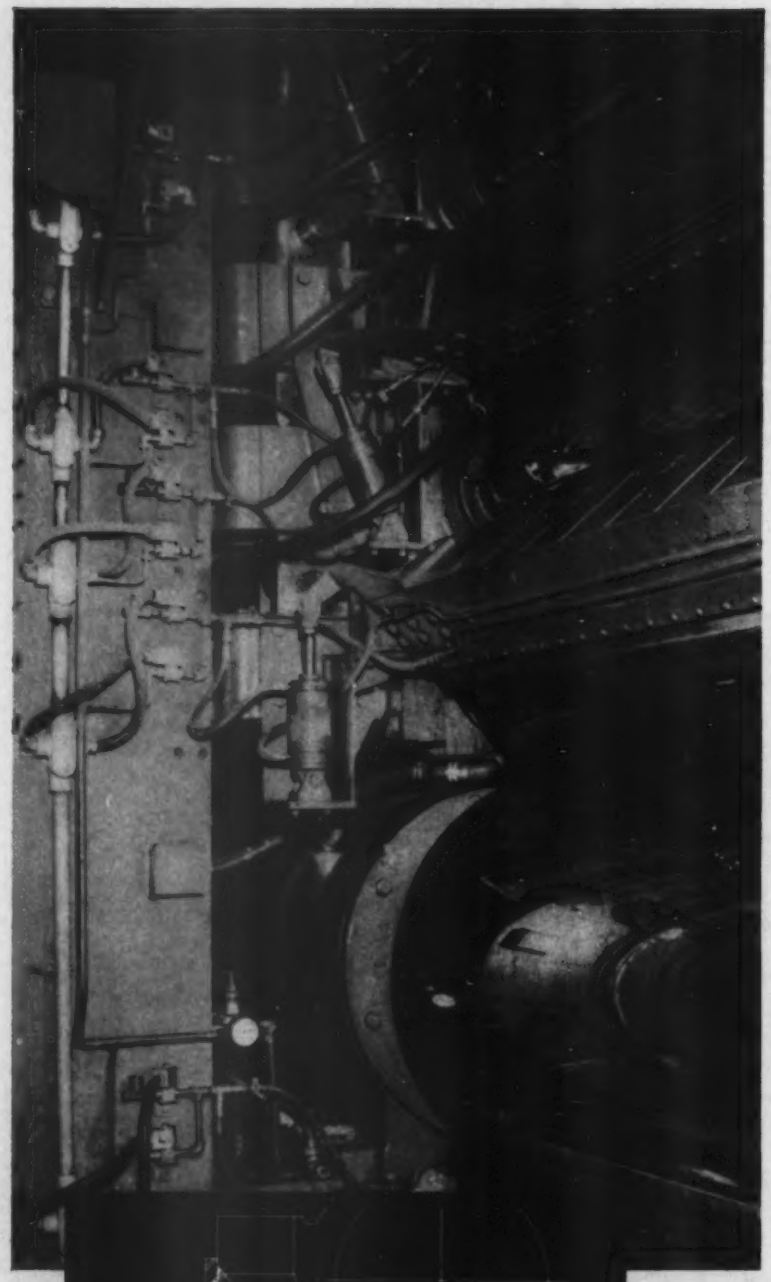


Clean rolls and Lodding Doctors

CLEAN ROLLS go hand in hand with Lodding Doctors. Mills throughout the country and many abroad have found this to be so — just as in the installation of calender doctors at the Chillicothe Paper Company.

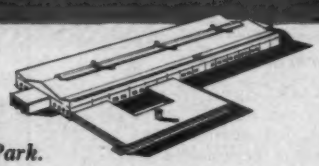
There's good reason for such universal reliance on Lodding. Most mills prefer to turn the intricate problems of doctoring over to specialists, where *each* doctor is custom engineered and precision built for *each* machine roll application.

Calender rolls are among the most difficult to doctor properly, yet among the most important. Thirty years of specialized experience with thousands of calender doctor applications stand behind Lodding's ability to lick even the most exacting problems presented.

For example, Lodding Calender Doctors are designed for mounting on the roll bearing housings to enable the doctor to ride with the roll at all times. This provides constant, uniform blade pressure with perfect alignment to the axis the entire face length of the roll. Doctor backs are built to individual specifications to provide the necessary strength and rigidity and, among other factors, to compensate for the roll crown. Clean nips result, allowing a free course for the sheet.

If proper calender doctoring — any other roll doctoring — is your goal, better specify Lodding.

LODDING
Engineering Corporation
AUBURN, MASSACHUSETTS



We welcome your inspection of our new plant located in Worcester's Auburn Industrial Park.

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New Products . . .

ing. None of the gage parts touch the fluid being measured, there are no moving parts, and explosion-proof design is standard. The radioactive gamma source, heavily shielded, permits general license distribution by the AEC to companies with no prior radio-isotope experience. *Ohmart Corp.*

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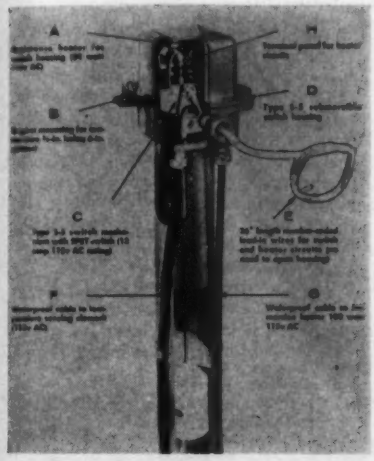

"No-Freeze" liquid level control

A device for monitoring the true level of water in outdoor storage tanks during freezing weather has been placed on the market recently.

This control system, Magnetrol model A-101, is equipped with an automatic thermoswitch which "cuts in" to supply current to an immersion heater within the water-filled aluminum tube of the assembly when the temperature of the water reaches 35° F. Thus, water inside the tube will not freeze and, by radiation, a sufficient area around the tube so that, regardless of low temperature, the Magnetrol displacers monitor the true level of tank water at all times. *Magnetrol Inc.*

Circle No. 24 on Readers' Service Card

Non-metallic couplings

A new line of couplings, now available, is said to stop electrolysis and corrosion where dissimilar metals, stray currents, soil conditions and chemicals are contributing factors. The couplings are made of a fiberglass reinforced epoxy structure.

A reported 150 psi operation can be maintained with a safety factor of over 10 to 1. Operating temperatures up to 300° F. are feasible if non-shock pressures do not exceed 100 psi. Available from stock in standard I. P. threads of 1, 2, 2½,. 3 and 4 in., the couplings are also obtainable in made-to-order special sizes. *Ed Conley Plastic Corp.*

Circle No. 25 on Readers' Service Card

Temperature controller

Developed for accurate control of remotely readjusted temperatures in heating, air conditioning and industrial processes, the series 200 Submaster regulator is a pneumatically operated temperature controller whose control point is re-set by a master controller or positioning switch. The master may be a thermostat, hygrostat, pressure regulator or a manual positioning switch.

Some of the submaster's design features include: a large easy-to-read scale (5⅜ in. long); a universal mounting, suitable for either panel or surface mounting with bottom air connections; adjustable sensitivity, easily changed. *Powers Regulator Co.*

Circle No. 26 on Readers' Service Card

Pyrex heat exchangers

Standard and regenerative Pyrex shell and tube heat exchangers with a reported 60-sq-ft capacity are now available, in addition to redesigned 13½-sq-ft capacity models. The units are designed for processing corrosive fluids.

Engineered for cooling purposes, standard units have a steel shell; units designed for regenerative service are jacketed in hard, low-expansion borosilicate glass which is highly resistant to heat, shock and corrosion. All units are reported to be capable of operating temperatures up to 200° F. on the shell side and up to 375° F. on the tube side. Working pressure can be as high as 20 psi. *Corning Glass Works.*

Circle No. 27 on Readers' Service Card

Helical speed reducers

A new series of quadruple-reduction, helical speed reducers with precision-ground gearing are available in AGMA ratios of 106:1 to 650:1 and are rated to 815 hp. with an efficiency rating of 95 per cent. They are designed to meet AGMA standards for the most severe overhung load and shock conditions.

Gearing and shafts are machined from alloy steel forgings; gear teeth are hobbed, hardened and precision ground to absolute accuracy of involute and helix angle; oversize, anti-friction bearings are used throughout for high efficiency, correct center distances and proper alignment. *Philadelphia Gear Corp.*

Circle No. 28 on Readers' Service Card

Glass drainline system

A new, light-weight, glass drainline system featuring simple, one-piece couplings for making quick, permanent compression joints has been introduced for disposal of chemical wastes.

The system is designed for vertical or horizontal mounting and can be buried in the ground. Piping and fittings, made of hard, low-expansion borosilicate glass, are reported to be resistant to virtually all corrosives. Designed to handle working pressures up to 15 psig and temperatures to 250° F., the drainline system is available

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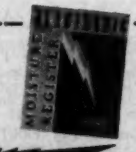

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in standard pipe lengths of 5 and 10 ft. and diameters ranging from 1½ to 6 in. *Corning Glass Works.*

Circle No. 29 on Readers' Service Card

Resyn 26-2404

A new vinyl acrylic copolymer solution, Resyn 26-2404, is said to have exceptional utility for the lamination or formulation of pressure-sensitive adhesives. The resin is tacky and shows specific adhesion to most cellulosic and synthetic products including cellophane, nylon, polyethylene, saran, paper and foil, etc.

Easily thinned with inexpensive solvents, the new resin reportedly provides excellent heat and light stability and is compatible with a variety of modifying resins. *Resin Div., National Starch & Chemical Corp.*

Circle No. 30 on Readers' Service Card

Automatic carton sealer

An easy-to-operate automatic carton sealer, now available, is said to insure better packaging at lower costs by speeding and improving the sealing of telescopic cartons in which papers are packed. Design features include an arrangement of electric eyes which automatically compensate for varying carton sizes up to 38 by 50 in.

The sealer, 132 by 69½ by 40 in. (LWH), comes completely assembled and ready to operate. *Southworth Machine Co.*

Circle No. 31 on Readers' Service Card

Foil-type pulp screen

The Vertifoil, a new pulp screen, adjusts to any pulp while running. A single variable control sets the screen's special foils to handle the requirements of all pulps; screen changing is unnecessary.

Designed for use in both pulp and paper mills, the Vertifoil is easily installed. The inlet revolves 360° in relation to the outlet in order to fit any existing mill arrangement. All parts of the screen in contact with stock are made of stainless steel. *Koehring-Waterous Ltd., a subs. of Koehring Co.*

Circle No. 32 on Readers' Service Card

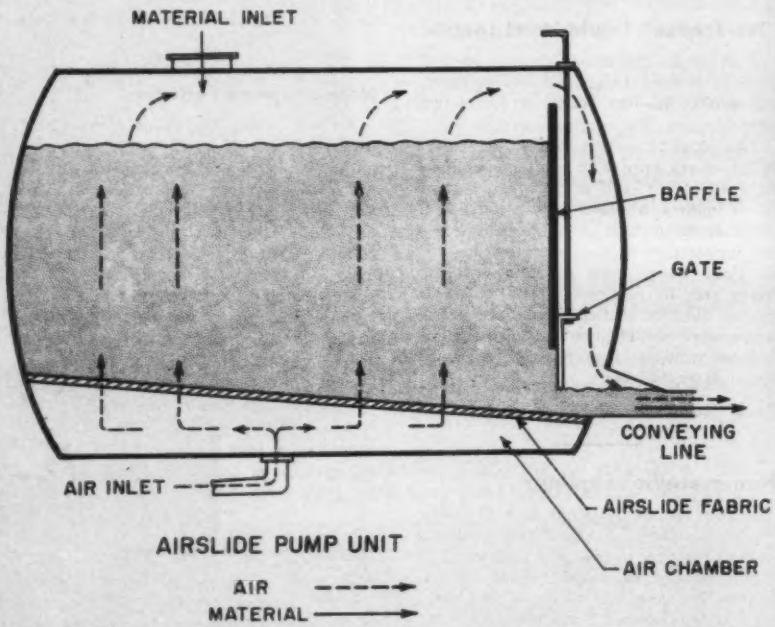
Demineralizer

A new packaged demineralizer, designed for quick installation, is now available. Designated as the Uni-Pac "M" series, models of the new unit are obtainable in capacities from 2100 to 13,200 gph using raw water with 10 grains per gal. total exchangeable anions.

Operating valves and piping are corrosion-proof PVC; exchange tanks are lined with the same material. Auxiliary polyethylene regenerant tanks are provided for acids and alkalis.

Units are equipped with conductivity and rate-of-flow indicators. Optional controls include a totalizing water meter, an audible alarm and an automatic cut-off valve. *Cochrane Corp.*

Circle No. 33 on Readers' Service Card

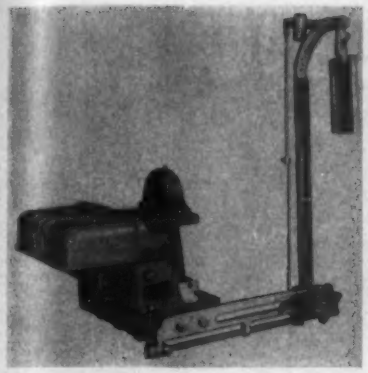


Self-discharging trailer

The feeding of dry, bulk material into a pneumatic conveying line is controlled as to material-air ratio by a new, low-pressure tank and pump combination, now on the market. A single source of air supply provides pressure for unloading, feeding and conveying.

Called Airslide Pump, the unit is of light-weight construction and may be conveniently mounted on truck, trailer or skids. *Fuller Co.*

Circle No. 34 on Readers' Service Card



Air guide

A new felt and wire air guide (model 560-A), designed for paper machines between 120 and 200 in. wide, is suitable for machine speeds up to 3000 fpm. It will fit in any space where a mechanical guide is installed and, in most instances, the air guide can be mounted on a paper machine using the existing guide roll, bearings and backstand.

Standardization of guides on a paper machine is possible because the same model air guide is used for wires, wet felts and dryer felts. *Appleton Machine Co.*

Circle No. 35 on Readers' Service Card

Selectifier screen

A new selectifier screen, model 12-P, is a low-capacity unit designed to handle a maximum of 1200 gpm at 0.5-per cent consistency. It operates under pressure and completely full of stock at all times. *Shartle Div., Black-Clawson Co.*

Circle No. 36 on Readers' Service Card

All-vinyl number markers

Lube labels, made from tough, self-sticking vinyl material, are stocked in five bright, fade-proof colors. Highly resistant to oil, grease and abrasion, the labels have large, bold, sealed-in numerals (0 through 9) which are centered in a ⅝-in. dia. die-cut circle. These color-number combinations give lubrication engineers 50 codes to identify different greases, oils and fluids used in their plant. Other labels, used to indicate lubrication frequency and to mark lubricant dispensers, containers, etc., are also available from stock. *W. H. Brady Co.*

Circle No. 37 on Readers' Service Card

Pressure reducing valve

An external pilot-operated steam pressure reducing valve, recently placed on the market, is reported to meet all requirements for use at most steam pressure reducing valve installations.

Called No. KP-4, the valve is manufactured in sizes from ¾ to 4 in. and is available with bronze, semi-steel or cast steel body. Screwed ends are offered in sizes up to 3 in.; flanged bodies in sizes from 1¼ to 4 in. Stainless steel trim in both main and pilot valve is standard in all sizes. *Klipfel Valves Inc.*

Circle No. 38 on Readers' Service Card

Feedback servoactuator

A new line of electrohydraulic servoactuators that employ mechanical feedback, have application in missle and spacecraft controls, as well as in critical industrial systems where high performance and high power control is needed. This new design features a lightweight, compact, simplified configuration with reportedly improved performance and reliability.

Numerous auxiliary components such as telemetry potentiometers, force or velocity limiters and shut-off solenoid valves, may be included as integral assemblies. *MOOG Servocontrols Inc.*

Circle No. 39 on Readers' Service Card

Penton fittings and lined pipe

The first all-Penton and Penton-lined metal fittings, in addition to the first metal pipe with injection-molded Penton lining, has been announced by the manufacturer.

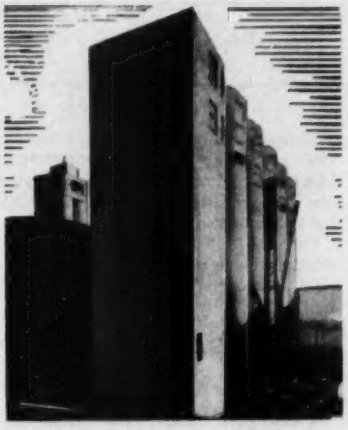
Penton, a new chlorinated polyether thermoplastic, is credited with exceptional corrosive resistance and the ability to handle elevated temperatures (including low-pressure steam).

The company has announced that prices of pipe and fittings will run as much as 50 per cent less than those for fluorocarbon-lined pipe. *Tube Turns Plastics Inc., an affil. of Chemetron Corp.*

Circle No. 40 on Readers' Service Card

Honed gears

An abrasive honing process, having the advantage of being applicable after gear-tooth hardening by heat treatment, is being used in the manufacture of the Syncrogear motor lines. The same process is being incorporated into the U. S. Syncrogear



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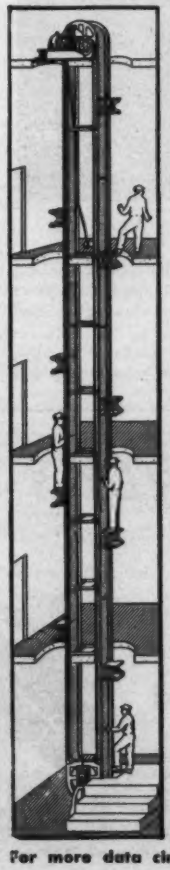

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New Products . . .

separate speed-reducers; the Shaftmount Syncrogear (for direct mounting on the driven shaft) and the Motomount Syncrogear (for speed reduction with interchangeable foot-mounted motors).

These U. S. Syncrogear lines are all currently available on the market. *U. S. Electrical Motors Inc.*

Circle No. 41 on Readers' Service Card

Pulp decker

A new pulp decker, now available, has a unique, free-flow cylinder mould which is said to stay clean longer because it has no central shaft, spiders or winding wires to cause a pile-up of loadings.

The machine, called the Gravi-Decker, can be used in de-chlorinating de-inking, de-watering, thickening, white water recovery, wet lap and liner board sheet formation, etc. All parts of the decker in contact with the stock, with the exception of stainless steel, bronze and plastic, are covered with rubber. *Koebring-Waterous Ltd., a subs. of Koebring Co.*

Circle No. 42 on Readers' Service Card

Glasteel pipe

A new Glasteel pipe that can be field-cut to required lengths, has more than twice the glass thickness of previous glass-lined pipes.

Rated at 150 psi and available in 1½-, 2- and 3-in. dia., F-C Glasteel pipe has wide application in highly corrosive services (all acids, with the exception of hydrofluoric, to 350° F. and mild alkalis at moderate temperatures). It is also ideal for those applications where freedom from product contamination or adhesion is required. *Pfaudler Co., a subs. of Pfaudler Permutit Inc.*

Circle No. 43 on Readers' Service Card

Mobile display truck

As an educational service to customers in the process industries, Fisher Governor Co. has introduced a new mobile display truck. This unit is equipped with sectional and working models of the company's regulators and controllers, an educational movie and a supply of literature.

Equipment is removable for display purposes, but may also be shown in the truck when the powered side-panels are raised. Company representatives accompany the truck and are available to explain and demonstrate the equipment and conduct plant educational programs. *Fisher Governor Co.*

Circle No. 44 on Readers' Service Card

Speed indicator

A new speed-indicating instrument, type K-241, for use with small steam or gas turbines, is now available. The principal advantage of the indicating device is that no mechanical connection is required between it and the rotating shaft.

An electromagnetic pick-up, located near a gear or notched shaft, senses the rotating part's speed. This signal is applied to an all-static circuit which transforms the pulses from the pick-up to a dc millivolt signal. The out-put signal magnitude is proportional to the pulse frequency.

By proper design of the gear or notched shaft, the device is adaptable to almost any desired rpm range. Other possible applications for the unit include a broad-band frequency meter, a speedometer, or almost any application where there is a continuous source of pulses or ac supply. *Westinghouse Electric Corp.*

Circle No. 45 on Readers' Service Card

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NEW LITERATURE

Books

PACKAGE DESIGN ENGINEERING, by Kenneth Brown. Published by John Wiley & Sons Inc., 440 Fourth Ave., New York 16. Pages: 263. Price: $8.50.

According to the book, the shipping container is a personalized thing. The author chose a fundamental engineering approach to this subject and kept a balance between military and commercial applications.

First discussed in the book are the basic fundamentals in static and dynamic mechanics, strength of materials and stress analysis. This information establishes the background, needed by the packaging engineer, to solve structural and dynamic packaging problems.

Considerable attention is then devoted to the design characteristics of the four most common suspension systems — tension spring, rubber shear mount, solid cushioning and canvass strapping. The peculiarities of corrugated, sheathed crate, plywood and metal shipping containers are discussed at length.

The book is concluded by illustrating the engineering fundamentals and design application of de-humidification and pressurization, vibration and package-test instrumentation.

TABLES OF THE BIVARIATE NORMAL DISTRIBUTION FUNCTION AND RELATED FUNCTIONS (National Bureau of Standards Applied Mathematics Series 50). Compiled and edited by the National Bureau of Standards, U. S. Dept. of Commerce. Pages: 1258. Price: $3.25. Order from Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C.

This book, according to the National Bureau of Standards, contains the most complete amount of reference material available on the bivariate normal distribution function. The volume includes an introduction describing the mathematical properties of the functions and outlining interpolation techniques and an extensive section on applications of the tables. Among the applications mentioned are evaluating measurement errors in a calibration system, calculating integrals over polygons with respect to bivariate normal distribution, heat flow problems and psychology problems.

Booklets and Pamphlets

TEST PROCEDURES PACKET, has been announced by The Technical & Specifications Committee of the Pressure Sensitive Tape Council. The new looseleaf packet, contains a series of 13 testing procedures (bound in a folder for convenient reference), that it recommends for testing pressure-sensitive tapes. The procedures are: peel adhesion, shear adhesion, unwind adhesion, tensile strength, thickness (caliper), elongation, moisture-vapor transmission, water penetration, resistance to high temperature and humidity, resistance to humidity at room temperature, quick stick, stain test for finishing and cold-temperature performance. Obtainable from Pressure Sensitive Tape Council, 1201 Waukegan Rd., Glenview, Ill., at $1.00 per copy.

PROPERTIES OF HARDWOODS AND THEIR RELATION TO PULP AND PAPER MANUFACTURE, a 162-page brochure, contains all formal papers, panel-discussion material and edited transcripts of all floor discussions presented at the 1958 International Fundamental Research Symposium in Montreal, Canada, last September. Available from the Technical Section, Canadian Pulp & Paper Association, 2280 Sun Life Bldg., Montreal 2, P. Q., Canada. Price: $2.00 per copy.

USDA Reports

1958 ANNUAL REPORT, prepared by the Southeastern Forest Experiment Station, contains 72 pages covering such material as forest utilization, forest fires, watershed management, range management, forest economics, forest insects, forest diseases and forest management. Included are 60 figures and 17 tables. At the end of the report are five pages, listing publications by members of Southeastern's staff, including cooperators. Copies of the 1958 annual report may be ordered from Joseph F. Pechanec, Director, Southeastern Forest Experiment Station, U. S. Dept. of Agriculture Forest Service, Asheville, N. C.

SURFACE FLAMMABILITY OF VARIOUS WOOD-BASE BUILDING MATERIALS is the title of Report No. 2140, recently issued by the U. S. Forest Products Laboratory. The new report is said to provide for the first time, new comprehensive information on how rapidly flame spreads across the surface of lumber, plywood, hardboard, particle board and fiberboards. Copies are available from to the Director, U. S. Forest Products Laboratory, Madison 5, Wis.

VIRGINIA'S TIMBER, by Robert W. Larson and Mackay B. Bryan, is the title of Forest Survey Release No. 54, which has been issued by the Southeastern Forest Experiment Station. This 72-page bulletin discusses such topics as trends in timber use, trends in the timber supply and increasing the timber supply. Obtainable from Joseph F. Pechanec, Director, Southeastern Forest Experiment Station, U. S. Dept. of Agriculture Forest Service, Asheville, N. C.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Conoflow equipment application

Conoflow Corp. is offering a bulletin that shows, in diagrammatic form, the application for Conoflow equipment in modern pulp and paper making processes. Information in the 16-page bulletin includes only the major systems and the most obvious applications for Conoflow valves, transmitters, etc.

Circle No. 46 on Readers' Service Card

Debarkers

Carl W. Mullis Engr. & Mfg. Co. is offering an eight-page bulletin on their Log Skinner line of debarkers. The brochure contains many illustrations of special design features, information on available models and detailed specifications on Model LS-30.

Circle No. 47 on Readers' Service Card

Material handling booklet

Whiting Corp. welcomes your request for their new, 16-page booklet on material handling equipment. Containing many illustrations, this condensed catalog describes overhead traveling cranes, Trambeam monorail and crane systems. Pressure-grip vacuum handling systems and the Track-mobile.

Circle No. 48 on Readers' Service Card

Procedure for grinding rolls

Landis Tool Co. has published a 20-page handbook that gives the correct procedure for grinding mill-roll bodies in steel, aluminum and paper mill roll shops. This booklet contains information never before published on speeds, feed rates, traverse speeds, work speeds, wheel dressing, coolants, lubrication, wheel conditioning, and the effects of hard and soft acting wheels.

Circle No. 49 on Readers' Service Card

Paper testing price list

United States Testing Co. Inc. has published a new price list which covers their services in the paper technology division. In addition to standard test facilities, the paper laboratory also has available the Gelbo flex tester, Martin Sweets' Neenah expansimeter, the Sentinel heat seal tester, Gurley-Hill or Bekk smoothness testers and the Thwing-Albert handle-o-meter.

Circle No. 50 on Readers' Service Card

Combined catalog — directory

Borden Chemical Co. is offering a new 56-page product catalog and company directory. The cross-indexed catalog lists specifications, end-uses,

PUT ACTION IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

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A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

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For more data circle 139 on Post Card

and other technical data on the company's industrial and consumer products. The directory lists the company's sales and service centers in the United States, its 17 plant locations, warehouse points and eight overseas manufacturing subsidiaries.

Circle No. 51 on Readers' Service Card

Oilers and oil controls

Lunkenheimer Co. has published a completely revised, four-page circular describing bottle oilers, oil cups and constant-level oil controls. This illustrated circular gives application data and dimensional specifications that covers automatic constant-oil-level controls, bottle oilers for plain bearing lubrication, glass-body oil cups and aluminum-body oil cups for severe industrial service.

Circle No. 52 on Readers' Service Card

Butterfly valves

Continental Equipment Co. Div. of Fisher Governor Co. is offering a four-page bulletin that describes their complete line of butterfly valves. Eight designs, presented in tabular form, make comparison and selection easy. Valve sizes range from 1 to 108 in. with pressure drops up to 1200 psi and temperatures up to 2000°F.

Circle No. 53 on Readers' Service Card

Sewage effluent problems

Betz Laboratories Inc. announces the publication of a technical paper on problems in the use of sewage plant effluent for boiling and cooling purposes. This 16-page study tells how the effluent can be used satisfactorily in recirculating cooling systems and as boiler makeup, provided it is adequately treated to avoid operating problems.

Circle No. 54 on Readers' Service Card

Automatic control systems

Barber-Colman has just released a manual that gives detailed descriptions of their complete line of automatic control systems for hot water, steam, gas-fired and electric unit ventilators. Control applications are shown on each page that cover all makes and models marketed by the major unit ventilator companies. Complete cycles of operation, damper sequence charts, specifications for precise temperature control and installation data are included for each.

Circle No. 55 on Readers' Service Card

Price list supplement

Bulkley Dunton & Co. Div. of Carter Rice Storrs & Bement Inc. has just published their 1959 price list supplement which provides complete, current prices on papers for printing, publishing, business, advertising and industry. A Hammermill graphicopy insert, included in the book, covers a complete line of papers for printing, duplicating and office use.

Circle No. 56 on Readers' Service Card

Boiler water gages

Jerguson Gage & Valve Co. is offering a new data sheet on their Refracolor high-pressure boiler water gages. The release gives design features, maintenance procedures and gage specifications.

Circle No. 57 on Readers' Service Card

Glycol-ether solvents

Union Carbide Chemicals Co., a division of Union Carbide Corp., has published a new 40-page booklet containing comprehensive data for 14 glycol-ether solvents, including physical properties, chemical derivatives, end-use possibilities, storage and handling, physiological properites, specification limits and test methods. The booklet also has a detailed bibliography and reference section.

Circle No. 58 on Readers' Service Card

Welded steel pulleys

Link Belt Co.'s new book, Die Crown Welded Steel Pulleys, describes a new hydro-expansion-formed belt conveyor pulley that increases conveyor belt life, has a 25-per cent greater strength, is concentric to within .030 in. and is free from crown welds. The new eight-page publication gives detailed engineering and selection data. Information on lagged pulleys, shaft and pulley assemblies is also given.

Circle No. 59 on Readers' Service Card

Research and development facilities

Plastics Div., Koppers Co. Inc. welcomes your request for their booklet which describes some of the research and development facilities available for the creation of better styrene-butadiene latices. The 16-page booklet is richly illustrated with photographs which show testing facilities and operations.

Circle No. 60 on Readers' Service Card

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Well established New England manufacturer of heavy equipment for the pulp and paper industry, needs a young sales engineer to be located in the lake states area. Should be graduate mechanical or chemical engineer, preferably with stock preparation background. Excellent salary. Adequate expense account. Car furnished. Send complete resume which will be kept confidential by our executives to Box 682, The Paper Industry.

WANTED

Two young mechanical engineering graduates are needed by a well known manufacturer of heavy machinery as resident sales engineers. Good salary, benefits and opportunities for advancement for ambitious young men. Fine living accommodations in a New England community in the heart of year-around recreational areas. Your resume will be kept confidential. Write to Box 683, The Paper Industry.

"108" Hanchett Knife Grinder available. Solid straight wheel parallel to knife — Model GK — Hydraulic Drive A. C. 3 phase — Top condition — Priced at less than half new cost.

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Add to your retirement income by making your paper mill knowledge pay off. Spare time. No selling. Write Box 690, The Paper Industry.

Two openings in Engineering Department of specialty mill located in Western Massachusetts.

1. Staff Electrical Engineer; instrumentation experience desired, along with normal electrical maintenance and design.
2. Draftsman — Designer — experience in paper mill preferred, but not necessary.

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CHARLES P. RAYMOND SERVICE, Inc.

THE POSITION YOU WANT may be available right now. The demand for executives is increasing. Salaries are attractive. You are invited to send us your resume in confidence.

THE EXECUTIVE YOU NEED may be listed with us. Employers find our Service helpful and time saving.

Your phone call, wire or letter will bring prompt attention. LIberty 2-6547 — 294 Washington St. — Boston 8, Mass.

MALE HELP WANTED

PAPER & POLYMERS: Applied research and creation of new ideas for polymer saturated specialty paper products in our Polyfibron Laboratory. Experience desirable; creativeness vital. New position carries responsibility for progress of products through production.

Send resume to: Industrial Relations Dept., Dewey and Almy Chemical Division, W. R. Grace & Co., 62 Whittemore Ave., Cambridge 40, Mass.

For more data circle 140 on Post Card

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Names in the News . . .

(Continued from page 726)

York, was elected a director of Mead Corp. Temple will fill the vacancy created by the death of Walter H. J. Behm.

William H. Delavan has announced his retirement as president of the Delavan Division of Mead Containers Inc., a subsidiary of Mead Corp. Delavan said his retirement would allow him to devote more of his time to other civic and business interests, including the expansion of Syracuse Steel Buildings Co. Inc. which he recently acquired.

Delavan has played a prominent role in the development of Delavans Inc. since it was jointly founded in 1933 by his father, B. H. Delavan; his brother, Nathan H. Delavan; and himself. William Delavan assumed the presidency in 1955 when his brother retired. Four years later, he sold his interest in the company to Mead Corp. At that time the company's name changed to the Delavan Division of Mead Containers Inc. of New York.

Orr Felt & Blanket Co.

Daniel J. Walsh Jr. has been added to the Felt Sales service staff. Walsh and Joe Waters will divide the New England Territory. Dan Walsh's home address is: 54 Buckman Drive, Lexington, Mass., Phone: VOlunteer 2-5837.

Shuler & Benninghofen

H. C. Bement of El Monte, Calif., was the first winner of the current Shuler & Benninghofen contest.

Bement's suggestion, which was sent to "Ham Feltz", was: "Mt. Rushmore National Memorial in Black Hills—the biggest in the U.S.A.—Reminds me of HAMILTON Felt's giant felt loom". This idea was used by Shuler & Benninghofen in the advertisement which appeared on page 583 in the November issue of The PAPER INDUSTRY.

Bement, who is employed by Crown Zellerbach Corp. received a Shakespeare Spincast rod and reel from Shuler & Benninghofen for his suggestion.

Weyerhaeuser Co.

Norton Clapp has been elected as the new president for Weyerhaeuser, succeeding F. K. Weyerhaeuser.

F. K. Weyerhaeuser has announced his retirement as president effective February 1. Weyerhaeuser has been president of the company since the death of his brother, J. P. Weyerhaeuser Jr. in 1956.

Norton Clapp of Seattle, Wash., has been elected to succeed F. K. Weyerhaeuser as the company's new president. Weyerhaeuser will continue to serve as chairman of the board.

Bowaters Southern Paper Corp.

D. W. Timmis, first vice-president at Calhoun, has become managing director of the Tasman Pulp & Paper Co. Ltd. of New Zealand.

V. J. Sutton, vice-president, operations of Bowaters Southern, has become vice president and general manager of the company. Sutton will also succeed Timmis in the latter's post as vice president of Bowater at Catawba, S. C.

Link-Belt Co.

Wayne J. Mitchell has been appointed to succeed Lester T. Graham as district manager at Portland, Ore. Prior to this assignment, Mitchell had been serving as a sales engineer at the Portland district sales office since 1956.

Lester T. Graham is retiring after 42 years with Link-Belt and its Pacific Coast predecessor organization. He was appointed district manager at Portland in 1943.

F. C. Huyck & Sons

Arthur S. Hayeslip has been appointed vice president in charge of sales for the Huyck Felt Co. in Rensselaer, N. Y., a division of F. C. Huyck & Sons. In this new appointment, Hayeslip will fill the vacancy created when Mr. Soderberg assumed the responsibility of general manager of the Huyck Felt Co.

Hubinger Co.

Richard H. Bublitz has been assigned to service Wisconsin, Northern Illinois and Southwestern Michigan for the Bulk Division of Hubinger. Bublitz will call on and service paper mills and corrugators in this area. Bublitz's headquarters will be 129 East End Ave., Libertyville, Ill.

Dwight Brothers Paper Co.

Donn G. Coleman has been named as president of Dwight Brothers Paper Co. of Milwaukee, Wis., a Champion paper merchandising subsidiary. Coleman was formerly the Chicago district sales office representative of Champion. He will succeed Norman W. Milner, who has been recalled to Champion's general office in Hamilton to take the newly created position of product manager of merchant papers.

Necrology . . .

Oliver Porter

Oliver M. Porter, former executive secretary of the American Paper & Pulp Assn., and later for 20 years, executive director of the U. S. Pulp Producers Assn., was a forester by training. He came to the industry from Syracuse, where he was on the faculty of the New York State College of Forestry. Porter was assistant secretary of the American Pulp & Paper Assn. under Dr. Hugh P. Baker from 1920 until 1928, when he assumed the position of secretary upon Dr. Baker's resignation. He later went to the Pulp Producers Assn. from which he retired 10 years ago for reasons of health.

Lionel Goldberg

Lionel M. Goldberg, 55, was vice president and general manager of the National Kraft Container Corp., Jersey City, N. J. Formerly vice president and assistant to the president of the National Container Corp., Goldberg was active in the formation of the Kraft firm last summer.

Truman Handy

Truman P. Handy, 69, was former vice president of the Celanese Plastics Corp. and chairman of the board of Celluloid Corp. A native of Short Hills, N. J., he served in these executive posts until his retirement in 1945. He held several government positions during World War II.

A. J. Miller Jr.

A. J. (Andy) Miller Jr., 52, was vice president of Industrial Relations, Mead Corp., Dayton, Ohio. He was first associated with the firm in 1944 as assistant director of Industrial Relations. Miller held this post for nine years until he was elected to the vice presidency in 1953.

Sidney Jacobson

Sidney Jacobson, 66, was president of the Henle Wax Paper Mfg. Co., the Bronx. He headed the firm, established by his late father, for 40 years. Jacobson's firm was one of the first in the country to manufacture wax paper products.

Oscar Gash

Oscar Gash, 65, was president of the former D. Gash & Sons Paper Co., Milwaukee, Wis. Cash was president of this firm for 30 years, until its liquidation in 1957.

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.b. New York:

	per cwt.	
No. 1 white shirt cuttings	13.00—	13.50
Soft unbleached muslins	15.50—	16.00
Fancy shirt cuttings	4.50—	5.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.50
No. 1 light silesias	6.50—	7.00
No. 1 light prints	4.75—	5.00
Light flannelettes	6.50—	7.00
Cottonades	2.75—	3.25
Blue overall cuttings	6.75—	7.25
Blue cheviots	6.75—	7.25
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.00—	5.50
American linen cuttings	6.75—	7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.	
No. 1 roofing (Chicago)	.65—	.75
No. 2 roofing (Chicago)	.55—	.65
Twos and blues, repacked	1.50—	1.75
Thirds and blues, repacked	1.50—	1.75
No. 1 whites, repacked	—	
No. 1 whites miscellaneous	—	
No. 2 whites, repacked	—	
No. 2 whites, miscellaneous	—	

RAGS (Foreign)

(ex dock New York City)

New Rags

per cwt.

Nominal:
- New dark cuttings
- New mixed cuttings
- New light silesias
- Light flannelettes
- Unbleached cuttings
- New white cuttings
- New light oxfords

- New light prints

Old Rags

per cwt.

Nominal:
- No. 1 white linens
- No. 2 white linens
- No. 3 white linens
- No. 4 white linens
- No. 1 white cottons
- No. 2 white cottons
- No. 3 white cottons
- No. 4 white cottons
- Extra light prints
- Ordinary light printe
- Medium light prints
- Dutch blue cottons
- French blue cottons
- French blue linens
- Checks and blues
- Linsey garments
- Dark cottons
- Old shopperies

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manila rope, domestic	—
No. 1 manila rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	90.00—	100.00
No. 1 hard white shavings	75.00—	80.00
No. 1 soft white shavings	50.00—	55.00
Soft white shavings, uncoated	60.00—	65.00
Fly leaf shavings No. 1	30.00—	35.00
Fly leaf, woody, No. 1	25.00—	27.50
Mixed colored shavings	21.00—	23.00
No. 1 books and magazines	24.00—	25.00
Ledger stock, white, No. 1	52.50—	55.00
Ledger stock colored, No. 1 (Midwest ship)	40.00—	
New manila envelope cuttings (free of groundwood)	70.00—	75.00
New manila envelope cuttings (containing groundwood)	50.00—	55.00
Manila tab cards	75.00—	80.00
Colored tab cards	55.00—	60.00
New northern kraft envelope cuttings	65.00—	70.00
Triple sorted kraft, 100%	35.00—	37.00
No. 1 old kraft	30.00—	
White news cuts, No. 1	60.00—	65.00
No. 1 overissue news	17.00—	19.00
Folded news, special	15.00—	16.00
Folded news, ordinary	13.00—	14.00
Old corrugated boxes	22.00—	23.00
New jute corrugated cuts	19.00—	20.00
Mill wrappers	11.00—	13.00
Boxboard cuttings	7.00—	9.00
No. 1 mixed paper	10.00—	12.00

CHEMICALS

F.o.b. New York City

Alum, ammonium		
Granular, bags, works, cwt.	4.30—	
Lump, drums, works, cwt.	5.05—	
Powdered, drums, works, cwt.	5.20—	
1-Arginine, drums, kilo	90.00—	
Blanc Fixe		
Direct process, bags, c.l., works, ton	145.00—	
L. c. l., ton	155.00—	
Bleaching Powder, drums, cwt.	—	
Casein, domestic acid precipitated		
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—	
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—	
China Clay, domestic dry-ground, airfloat, 99% 325-mesh bags, c.l., Georgia works, ton	10.00—	12.00
300-mesh bags, c.l., Georgia works, ton	13.50—	14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00—	35.00
Chlorine, liquid		
Tanks, single units, works, freight equaled, cwt.	3.15—	
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb.	.30⅞—	
Litharge, commercial powdered		
Barrels, c. l., works, freight equaled lb.	.13¾—	
Rosin, gum, c. l., f.o.b. New York, cwt.		
K, M	12.30—	
N	12.60—	
WG	13.10—	
WW	13.35—	
Rosin, wood, c. l., f.o.b., shipping point, cwt.		
K, M	9.65—	
N	9.85—	
WG	10.05—	
WW	10.35—	
Saltcake, domestic, bulk works, 100% Na_2SO_4, basis ton	28.00—	
Soda Ash		
Dense, 58%, paper bags, c.l. works, cwt	1.90—	
Light, 58%, paper bags, c.l. works, cwt	1.85—	
Soda, caustic		
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—	
Solid, 76%, drums, c. l. works, cwt.	4.80—	
Sodium Silicate		
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.65—	
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—	
Starch		
Pearl, 140-lb. bags, cwt.	7.51—	
Pearl, 100-lb. bags, cwt.	7.36—	
Powdered, 100-lb. paper bags, cwt.	7.48—	
Sulfur, crude		
Bulk, c. l. mine, contract, long ton	23.50—	
Talc		
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—	
Canadian, ground, bags, c. l. works, ton	20.00—	35.00
Titanium Pigment		
Calcium-rutile base, regular, bags, c. l., lb.	.09⅛—	
High-tinting, drums, c. l., lb.	.14⅛—	
Zinc Oxide Pigment, American process		
Lead-free, bags, c. l. freight allowed, lb.	.14½—	
Leaded, 35%, bags, c. l., freight allowed, lb.	.15⅛—	

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—162.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):		
No. 1 enamels	20.55	
No. 2 enamels	19.55	
Machine-coated, 45- to 100-lb.	15.55—	19.00
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	22.25	
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	21.10	
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt	
100% rag	—	
75% "	—	
50% "	—	
25% "	—	
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):		
100% rag	—	
75% "	—	
50% "	—	
25% "	—	
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):		
No. 1	—	
No. 2	—	
No. 4	—	
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):		
No. 1	—	
No. 2	—	
No. 4	—	

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	8.75
60-lb.	9.00
50-lb.	9.25
40-lb.	9.50
35-lb.	10.00
30-lb.	10.75
25-lb.	11.50
20-lb.	12.50
No. 1 Kraft Butcher — Pink	per cwt.
40-lb. only	10.25

(Sheets — Plus 50c cwt)

Engineering developments

(Continued from page 705)

man element out of weighing. This device can be plugged into a regular automatic weighing system and can control the weighing of up to 24 different ingredients in a batch. No dials are set manually; whenever another formula is desired the operator simply plugs in another capsule.

Pumps

A Free-Piston pump which should find wide application in the pulp and paper field was exhibited by Crossley Machine Co. The pump which operates by the action of compressed air on the floating cylinders has no moving parts — no motor, no drive shaft or belt and requires no packing or seals, oils or greases. The pump consists basically of three chambers made of stainless steel, each of which holds a free floating piston and a ball check valve made of steel-hard nylon. Its simplicity of operation and low maintenance requirement should guarantee a bright future for this pump in the pulp and paper field.

Robbins and Meyers featured their new Moyno pump which has found extensive application in the paper industry. The new Moyno is cradle mounted which permits the suction or discharge port to be rotated to any angle. It has a deeper stuffing box, a full-molded, one-piece stator, larger diameter vertical port and a higher pressure rating per stage.

An interesting pump that attracted considerable attention was the new pump developed by Goodyear Pumps Inc. There are only two moving parts in this pump: (1) the rotor, an Archimedean screw of special form and (2) a rotating rubber-covered plate engaging with the rotor and resulting in a rubber-to-metal wiping action. The pump is reported to operate at an exceptionally high efficiency and is credited with a very long life.

Short-cycle filtration

Filtration time is cut by an automatic short-cycle press developed by Read-Standard. This filter has a high rate of performance because there is no appreciable flow-rate drop as experienced due to the extensive cake build-up in conventional filter presses. As soon as flow rate drops, a pressure switch automatically stops filtration, the press is cleaned and put back in service. Total cycle time is 30 to 90 seconds depending on the material filtered.

A Read-Standard study showed that a comparison between the performance of a short-cycle filter and a vacuum filter resulted in a production rate of 75 lb/sq.ft./hr. for the short-cycle press which also delivered a 63 per cent moisture cake and a rate of 12 lb/sq.ft./hr. for the vacuum filter delivering a 70 per cent moisture cake.

Readco further exhibited its new mixer featuring a 50 per cent additional effective mixing area and consequently permitting improved dispersion of coating ingredients.

New blow ball valve

Blow valves, the indispensable requirement of every pulp digester, were exhibited by both Yarnall-Waring and Jamesbury Corp. A new digester blow ball valve was featured by Jamesbury Corp. The valve is equipped with Teflon seats and seals on both sides of the ball to insure a tight closure and zero leakage. The absence of crevices and pockets and the wiping action of the ball against the seats and seals, when opened, provides for a clean blow and full flow of chips.

The use of corrosion-resistant materials in these blow valves and their rugged construction calls for a minimum of maintenance except for an occasional replacement of Teflon seats and seals.

Among other equipment of interest to the pulp and paper industry shown at the exposition, was the Vibro-Energy mill developed by Southwestern Engineering Co. This mill uses a vibro-energy gyratory system for precision fine grinding of paper coating mixtures.

Wm. Steiner Mfg. Co. exhibited a series of Tan-jet, Fan-jet, Mist-jet, Span-jet, Solid-jet and Flo-jet spray nozzles for any spraying operation in the paper mills.

Effectively displayed was also Johns Manville's Metal-On, pre-jacketed steam line insulation, which was described in some detail in our November issue in connection with the article on Northwest Paper Co.

Atomized suspension technique

(Continued from page 703)

number of gases such as oxygen, hydrogen or fluorine that can easily be introduced at this point. Powdered catalysts may also be introduced into the reactor below the drying zone to create fast chemical reactions.

In the treatment of pulp mill effluent, thermal decomposition of the organic solids in the reactor leader to the evolution of gases resulting in the collection of high carbon content particles in the cyclone separators. This material is easily combustible and can be burned in the annulus of the reactor to supply additional heat. The ash of the burned material consists of inorganic chemicals which may be recovered subsequently.

Commercialization of AST applications

In addition to the three experimental AST reactors operated by the Pulp and Paper Research Institute of Canada, there are four other units installed in different parts of the world. The well-known design engineering firm, Ernest Scott & Co. Ltd., Leven, Fife, Scotland, has two gas-fired AST units in operation. General Electric Co. at Hanford, Wash., has an AST recator in operation for the purpose of studying the concentration of radioactive wastes. A small corrosion test reactor has been in operation at Green Bay, Wis. for several months. The Chemical Engineering Department for fundamental studies at McMaster University is planning to install a reactor to make fundamental studies of heat transfer and of other phenomena. The Lummus Co. has designed an experimental AST reactor for installation at its Development Center in Newark, N. J.

It is generally accepted that the time interval between the findings of a research investigation and the realization that such findings may have an economically attractive application can involve a number of years. Beyond this, the time required to design, build, erect and operate a commercial unit based on the new concepts and to get the inevitable, initial "operating bugs" out of it may take, a few additional years. Hence, it is not surprising that the varied applications of AST during the past few years have not all been translated into commercial plants.

It is significant, however, that a number of these applications are on the verge of being translated into commercial use.

Thus, the Green Bay Pulp & Paper Co. of Wisconsin has announced that it will use AST for chemical and heat recovery from its neutral sulfite semi-chemical pulp mill. The plant has been designed by Blaw-Knox, and at present there is a vigorous search for the best corrosion-resistant materials of construction for the ultimate plant reactors.

A mill of Enzo-Gutzeit in Finland, the largest kraft mill in Europe, has agreed to a proposal under which the Lummus Co. of New York will provide the design for an AST unit that will take kraft liquors from the conventional evaporators at some 55 per cent solids and extract sodium carbonate and sulfur dioxide to be used as make-up for the cooking liquor of the NSSC plant.

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Sinclair Company, The 745
Smidth & Co., F. L.
Spraying Systems Co. 732
Sprout Waldron & Co., Inc.
Staley Mfg. Co., A. E.
Standard Oil Co. (Indiana)
Stebbins Engineering & Mfgr. Co. 696
Stickle Steam Specialties Co. 733
Swenson Evaporator Company

Tennessee Corporation
Texas Gulf Sulphur Co. 712
Torrington Company, The

Union Asbestos & Rubber Co.

Valley Iron Works Company
Vanderbilt Co., R. T.

Waldorf Industrial Controls
Waterbury Felt Company 742
Weyerhaeuser Timber Co.
Whiting Corporation
Williams-Gray Company
Wisconsin Wire Works
Wolferz Alloy Equipment, E. C.

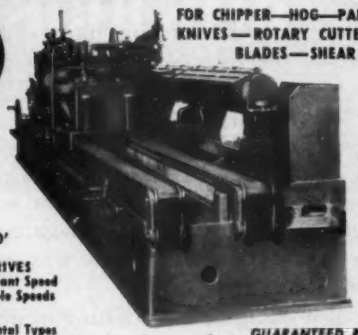
Yarnall-Waring Company

Professional & Business Service Section
Sirrine Company, J. E. 744

HANCHETT **KNIFE GRINDERS**

FOR CHIPPER—HOG—PAPER—VENEER KNIVES—ROTARY CUTTERS—DOCTOR BLADES—SHEAR BLADES, ETC

MODEL AK AUTOMATIC



EXTRA HEAVY DUTY Traveling Wheel Type

Capacity— 84" to 396"
Motors— 7½ to 40 HP
Speeds—10' to 100' and faster
TRANSMISSION DRIVES
Mechanical—Constant Speed
Hydraulic—Variable Speeds
WHEELS
Cylinder or Segmental Types
16 — 20 — 24" Diameter

1. Guaranteed Construction
2. Finest Materials
3. Advanced Design
4. Quiet, Smooth Running and Entirely
5. Free of Shock or Vibration

GUARANTEED PERFORMANCE
REAL WORK HORSES

We Guarantee our Machines to Deliver the Maximum in Precision Ground Knives per Hour with the Finest and Sharpest Edges for Longer and Better Cutting Action

MODEL GK AUTOMATIC

HEAVY DUTY Traveling Table Type

Capacity — 32" to 196"
Motors — 5 - 7½ - 10 - 15 HP
Table Speeds — Hydraulic (10' to 80' per min.); Mechanical (Constant)
Gears — Hardened
Bearings — Ball and Roller Types
OTHER MODELS
MODEL "DN" — For normal knife requirements — Sizes — 32" to 108"; Motors — 3 - 5 HP; Wheels — 10" to 14" Diameter — also Straight Wheel and Circular Knife Grinders

TABLE DRIVES
Mechanical
Hydraulic
Electrical

HANCHETT MANUFACTURING COMPANY
Main Plant BIG RAPIDS, MICHIGAN
West Coast PORTLAND 1, OREGON

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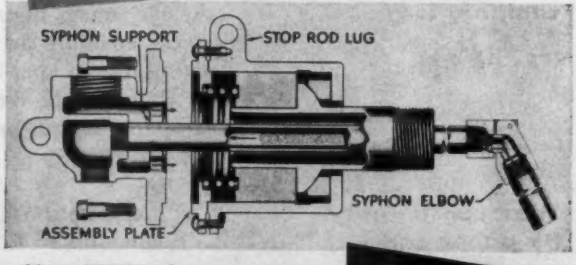
The right rotary joint for every need!

. . . ON PAPER MACHINE DRYERS
. . . CORRUGATORS
. . . CALENDERS
. . . ROOFING MACHINES
. . . WAXERS
. . . EMBOSSERS
. . . PRINTING PRESSES



Type "SBP" shown is completely self-supporting. Like all Johnson Joints it has no packing, needs no lubrication or adjustment. The syphon elbow replaces unwieldy curved condensate drainage pipes with two straight pipes, hinges to pass right through the joint. Write for Bulletin S-3002. Johnson Rotary Pressure Joints are available for all operating speeds, pressures, mountings.

Johnson ROTARY PRESSURE Joints First in the Paper Industry

THE JOHNSON CORPORATION
845 Wood St., Three Rivers, Mich.

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Whither?

... in production, processes, new products, markets

Latest figures on paper and paperboard output

Latest figures show a new all time record output in the U.S.A. of about 36 million tons of paper and paperboard for 1959 and forecasts for 1960 estimate a production of 36 million tons.

FAO forecasts a demand for North America of 43.7 million tons of paper and paperboard by 1965 and 57.3 million tons by 1975, while total world demand is expected to grow to 88 million tons in 1965 and 134 million tons in 1975.

A new one-piece frozen food package

A practical wrapperless carton has been developed by Weyerhaeuser which gives maximum protection for processed frozen food. The carton's components are: (1) a food board which provides good flexibility under freezing conditions and endures extreme changes in temperature; (2) a new cold-water wax which acts as a flux in floating adhesives over the carton's flaps, bonds with the carton and effectively seals the units so that there is no moisture transmission through the carton; and (3) a new adhesive which is only half as expensive as "hot" adhesives.

A special machine was also developed featuring automatic carton infeed and built-in sealing unit, to seal the frozen food carton and reducing labor cost nearly 40 per cent.

Low molecular weight polyethylene-wax combinations

Polyethylene has been used for over a decade in petroleum wax combinations at a maximum rate of 6 per cent because of the viscosity limitations of the waxer. With the advent in recent years of low molecular weight polyethylene, much higher percentages of it can be run on most conventional waxers, enabling the converter to choose the most suitable wax-polyethylene coating for any specific application.

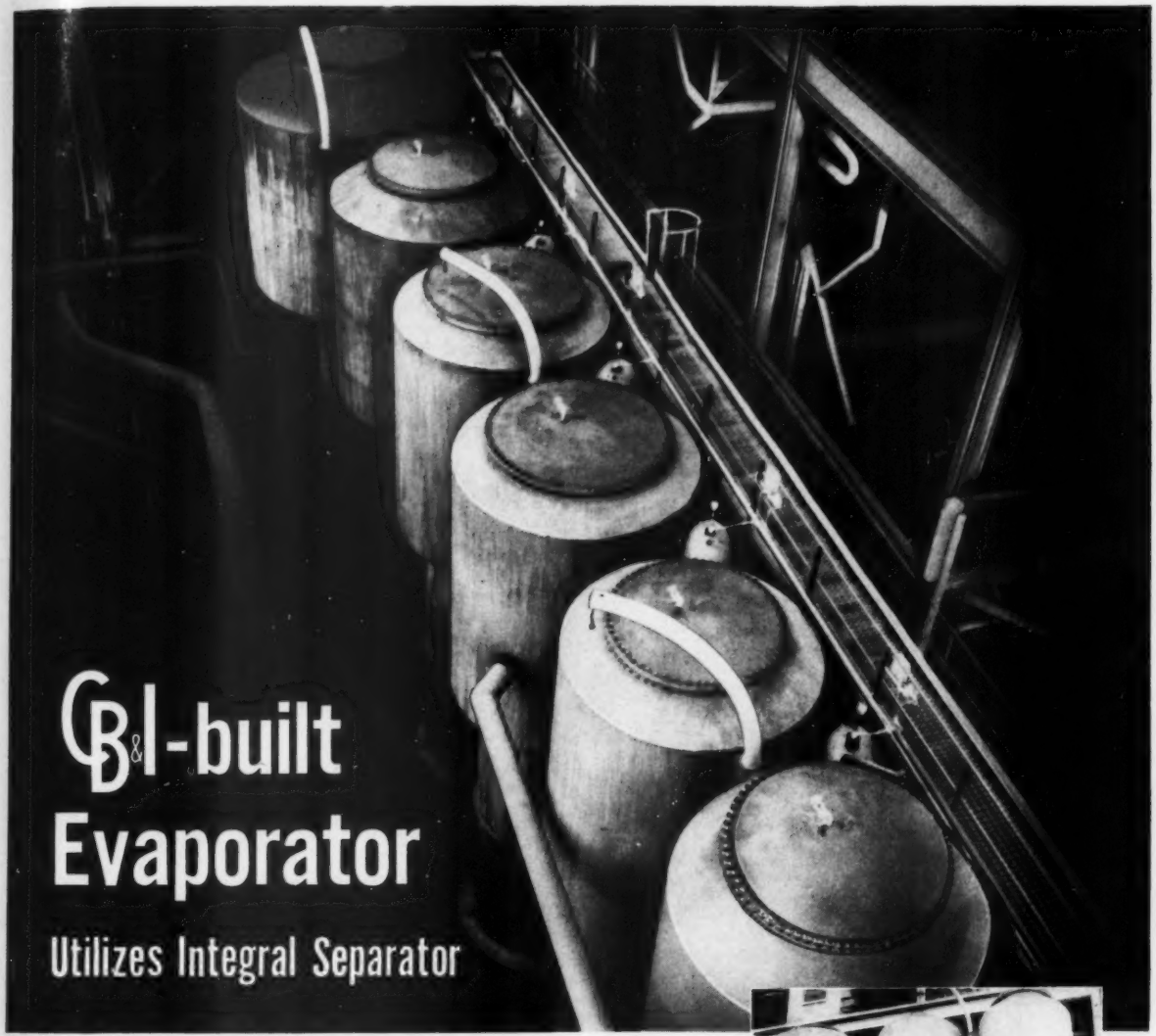
Polyethylene-wax blends are now being used in coating of milk cartons, corrugated board, butter and ice cream cartons, high-gloss frozen food cartons, etc.

Wax consumption by paper and paperboard

Wax consumption by paper and paperboard, according to M. W. Kane of KVP, amounts to 1,050,000,000 lb., valued at $60 to $70 million per annum. This figure is expected to increase to 1,250,000,000 lb., valued at $80 million in 1965. The increase over the 5 year period will be entirely due to increased production of waxed paperboard, according to Mr. Kane.

Repulping of polyamide wet-strength paper

Polyamide resin has the advantage of being both alkaline and acid curing and is used in toweling where maximum water absorbency is required and in container board where water resistance is of importance. Repulping of polyamide resin-treated papers is best carried out under alkaline conditions with moderately high temperatures and strong mechanical action. The operation is considerably speeded up by the use of oxidizing agents such as hypochlorite. However, when unbleached stock is present, the consumption of hypochlorite is too high to make its use economical.



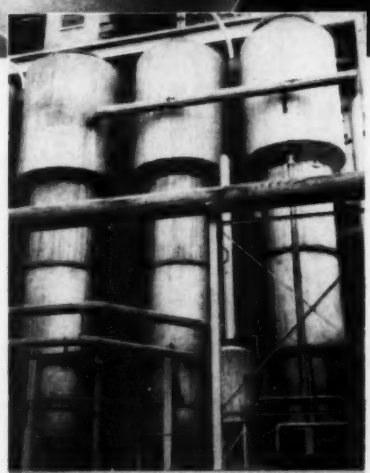
CB&I-built Evaporator

Utilizes Integral Separator

This six-body sextuple effect evaporator was built by CB&I for Container Corporation of America at Brewton, Alabama. It utilizes CB&I's patented integral separator, eliminating all external piping and valves . . . minimizes pressure drop and temperature loss across the system.

Tube sheets in all vessels and lower vapor body sections of No. 1 and 2 effects are fabricated of corrosion-resistant stainless steel Hortonclad®, assuring longer performance life.

A bulletin describing CB&I's *coordinated* services and equipment for the pulp and paper industry is available. Write for it today.



Top view: CB&I-built evaporator at Container Corporation of America plant, Brewton, Alabama. Easy accessibility for maintenance keynotes entire installation.

Directly above: CB&I patented integral separator eliminates external piping and valves . . . minimizes pressure drop and temperature loss.

CHICAGO BRIDGE & IRON COMPANY

332 SOUTH MICHIGAN AVENUE
CHICAGO 4, ILLINOIS

OFFICES AND SUBSIDIARIES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

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enlargement-22,000X

Unlocking the secrets of kaolin with the electronmicroscope

Among the many mysteries of printability is the actual relationship of the various kaolin particles to the adhesive at the surface of the sheet. In helping paper mills to solve such mysteries, Georgia Kaolin has been instrumental in developing electronmicrographic techniques for the study of paper surfaces. This photograph, typical of the results of such efforts, reveals the structure, arrangement and behavior of kaolin particles on a sheet of coated paper.

Every day the knowledge gained through the use of electronmicroscopes, X-ray spectrometers and other modern instruments by the GK Research Laboratories is helping solve problems that have direct bearing on the uniformity, quality and performance of your present products. Of equal, if not greater importance, is the value of this work to your new product development program.

These facilities, the best in the industry, are at your disposal.

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Fine clays from the world's largest kaolin plant

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